



\$2.00 PER YEAR.

ESTABLISHED 1878.

10c. SINGLE COPY.

VOL. XIX.

CLEVELAND, OHIO, JANUARY 2, 1896.

NO. 1

#### A FEW FACTS ABOUT 1895'S COAL TRADE.

The amount of coal shipped from lower lake ports was as follows: Buffalo, 2,620,768 tons; Conneaut, 171,461; Ashtabula, 979,199; Fairport, 224,080; Cleveland, 1,278,627; Lorain, 295,057; Huron, 171,211; Sandusky, 308,249; Erie and Toledo not yet reported. Buffalo's shipments were entirely of anthracite, and the other figures given are for bituminous coal exclusively, and show a total of 3,427,887 net tons, besides those of Erie and Toledo.

Coal receipts by lake at Milwaukee were 852,078 tons of hard and 483,864 tons of soft coal, an increase over 1894 of 68,260 and 30,723 tons respectively. The leading coal docks received coal as follows:

	HARD.	SOFT.
N. W. Fuel Co.	219,553	82,281
H. M. Benjamin Coal Co.	145,321	49,486
B. Uhrig & Son.	102,855	179,658
Coxe Bros. & Co.	96,981	20,100
Whittrill & Rademake	99,243	
Phila. & Reading C. & I. Co.	58,738	23,608
R. P. Elmore Co.	54,077	15,748

The total receipts at Duluth and Superior were about 2,000,000 tons, or slightly below the record of last year. There was about 250,000 tons on dock at the opening of the season, as compared with clean docks in the spring of 1895. Of these receipts but one-third is anthracite. The amounts as returned by the various companies give a total of 2,303,000 tons, but as many companies did not care to give exact figures the amount is considered a little high; Ohio Coal Co., 325,000; Pioneer Fuel Co., 200,000; Lehigh Valley Coal Co., 100,000; Northwestern Fuel Co., 750,000; Lehigh Coal & Iron Co., 130,000; St. Paul & Western Coal Co., 225,000; Pennsylvania & Ohio Coal Co., 150,000; Philadelphia & Reading Coal & Iron Co., 198,000; Youghoigheny & Lehigh Coal Co., 225,000.

At Two Harbors coal receipts (almost entirely bituminous) were 75,000 tons, one-third more than in any previous year.

#### TRADE JOURNAL ADVERTISING.

Here's an idea from Profitable Advertising, and it states the fact exactly when it says: "No doubt lots of money is squandered every year in catalogue advertising. Frequently a firm believes it good policy to restrict its newspaper and trade-journal advertising, and spend this appropriation in compiling an elaborate catalogue. Now, a catalogue may be a good thing, but it will prove more valuable to the house using it if, by continued advertising in suitable trade papers and others, a demand for it is created. It is better to have one inquiry requesting the catalogue, from some one really interested, than to send copies to two people who have expressed no desire for it. The clever trick is to interest people to the point of making them come to you, or write you for the goods you have for sale. Advertising is valuable if it succeeds in pulling replies from the people who want your catalogue because they want your goods."

#### GIVE THE COLLEGE MEN A CHANCE.

On December 10, 1895, Senator Squire, of Washington, introduced a bill whose provisions included that hereafter all scientific institutions, which establish a course of engineering satisfactory to the Engineer in Chief and the Secretary of the Navy, shall be permitted

to have the graduates taking such course appointed as cadets in the Engineering Corps of the Navy. After a year at sea, another year in an engineering post-graduate school, these civilian appointees are to compete with the U. S. Naval Academy graduates for commissions in the naval service; one half of the men so appointed, however, to come from the Naval Academy. Another provision is to increase the number of commissioned officers in the Engineering Corps, so that among other important shore duties they may be detailed as Professors of Marine Engineering at the colleges, as now established by law.

While but few graduates from one institution may so compete, still these measures will raise the requirements for admission and graduation, and greatly strengthen, unify and elevate the standard of engineering education in the several state institutions. With the bill now being formulated for the national endowment of engineering experiment stations in each of the Land Grant institutions, these other measures will form powerful factors in the industrial development of the several states.—Editorial in The Athenæum, of West Virginia University, Dec. 17, '95.

#### A BRITISH SHIP BUILDER DEAD.

Sir Edward Harland, head of the famous shipbuilding firm of Harland & Wolff, died at Belfast December, 24, at the age of 64. He was a large stockholder in the White Star Line, and made a baronet by the Salisbury ministry in 1895. He was twice mayor of Belfast, and was for many years chairman of the harbor commission of Belfast. He represented in Parliament the borough of North Belfast, representing the conservative interest. Besides Mr. Wolff, Messrs William Pirrie and John Wilson are prominent members of the firm. General Manager Carlyle will continue in charge of the shipyard. Mr. Walter Miller, who returned from Europe a few days ago, says the Harland & Wolff shipyard is the largest and finest in the British Isles.

#### A GREAT RECORD.

The steamship Virginia, on the Milwaukee route of the Goodrich line, made 120 trips in 121 days last season. The odd day that she was in commission was the day that she occupied in going to winter quarters at Manitowoc, in a partially dismantled condition. She always arrived at her destination on time. The longest delay at starting points was three minutes, and this on one occasion only. One night after discharging freight and passengers at Chicago, the Virginia was placed in drydock, had her bottom scraped and painted, and was at her wharf in plenty of time to get her passengers and freight next morning. The Virginia is a fine boat and is excellently well managed.

The suspension bridge at Niagara Falls is to be replaced with a steel arch bridge, wholly contained within itself, which will consist of a main arch span 840 feet long and two shore spans, that on the American side to be 190 feet long, and the span on the Canadian side 210 feet in length. The arch span will consist of an open parabolic rib 26 feet in depth, with a rise of 105 feet at the center. The roadway will be 46 feet in the clear.

#### THE WAR SCARE.

We take pleasure in calling the attention of our readers to a letter from Capt. John Maurice, of Chicago, in reference to a possible naval struggle on the Great Lakes between Great Britain and the United States. While the RECORD does not care to countenance anything in the shape of a scare, this article merely carries out the spirit of the motto, "In time of peace prepare for war," as the most effectual prevention of hostilities. The "war scare" has thus far proved an excellent thing, and the actions of President Cleveland and his cabinet are far from meriting the general denunciations which emanate from an impractical clergy and theory-mad college men. Modern warfare between civilized nations will no longer be the bloody affair that war has been in the past, and the "reckless expenditures" upon which these short-sighted economists dwell so mournfully are but the distribution of government money among the people. By far the greatest percentage of outlay for battleships and armour is disbursed in payment for labor, and the tax which liquidates the indebtedness, whether direct or indirect, comes chiefly from the wealthy classes. This certainly ought to please all sincere economic reformers.

But the best feature of the "war scare" is that it has rudely brushed aside the film which has covered the eyes of such a large portion of the population, who have been resting secure in ignorance of the exposed state of frontier, and in the halucination that there will be no more war. Ordinary prudence has been styled jingoism. The real jingo says:

"We've got the ships, we've got the men,  
We've got the money, too."

Now, if we haven't the ships nor the men, or haven't them immediately available, which amounts to the same thing, he is last of all a jingo who recommends coast-wise fortifications such as may sometime be necessary, and who advocates the construction of these before it is too late. There are very few well-informed men who believe that the United States and Great Britain will ever fight over Venezuela; but the interests of the two countries are on such similar lines that they cannot be other than opposed in many respects, and if this is true in commerce, it is the more likely to be true in the attitude of the governments which foster respectively their own commercial and manufacturing interests. It is almost safe to say now that this "war scare," if it continues a few weeks longer, will prove one of the very best experiences this country has ever had; and that, too, without any material disturbance of the friendly feeling between the inhabitants of the United States and of Great Britain and her colonies.

#### NOTES.

SECRETARY HERBERT has decided to name Battleship No. 6, Kentucky. No. 5 is known as the Kearsarge.

THE Senate on Saturday, December 21, confirmed the promotion of Major William Ludlow to the rank of Lieutenant Colonel.

CAPT. NICOL LUDLOW's promotion came too late for his assignment to the Boston, and he will probably succeed Capt. Merrill Miller in the command of the Raleigh next April, when that officer's term of sea duty will expire.



## LAKE CARRIERS' ASSOCIATION.

To consider and take action upon all general questions relating to the navigation and carrying business of the Great Lakes, maintain necessary shipping offices and in general to protect the common interest of Lake Carriers, and improve the character of the service rendered to the public.

## PRESIDENT.

WILLIAM LIVINGSTONE, Detroit, Mich.

## SECRETARY.

CHARLES H. KEEF, Buffalo, N. Y.

## TREASURER.

GEORGE P. MCKAY, Cleveland, O.

## COUNSEL.

HARVEY D. GOULDER, Cleveland, O.

## VICE PRESIDENTS.

J. C. GILCHRIST, Cleveland.	THOS. CRANAGE, Bay City
A. A. PARKER, Detroit.	W. S. BRAINARD, Toledo.
S. D. CALDWELL, Buffalo.	E. D. CARTER, Erie.
WILEY M. EGAN, Chicago.	J. C. RICKETSON, Milwaukee.
F. N. LASALLE, Duluth.	F. J. FIRTH, Philadelphia.

## EXECUTIVE AND FINANCE COMMITTEE.

H. M. Hanna, Cleveland, Ohio.	D. C. Whitney, Detroit, Mich.
H. Brown, Cleveland, Ohio.	W. P. Henry, Buffalo, N. Y.
James Corigan, Cleveland, Ohio.	J. J. H. Brown, Buffalo, N. Y.
H. A. How, Cleveland, Ohio.	David Van, Milwaukee, Wis.
Thomas Wilson, Cleveland, Ohio.	R. P. Fitzgerald, Milwaukee, Wis.
M. A. Bridg, Cleveland, Ohio.	John G. Keith, Chicago, Ill.
J. C. Gilchrist, Cleveland, Ohio.	J. S. Dunham, Chicago, Ill.
E. M. Peck, Detroit, Mich.	

## COMMITTEE ON AIDS TO NAVIGATION:

W. C. Richardson, Cleveland, Ohio.	W. M. Egan, Chicago, Ill.
George P. McKay, Cleveland, Ohio.	Frank Owen, Ogdensburg, N. Y.
H. G. Dalton, Cleveland, Ohio.	A. W. Colton, Toledo, Ohio.
R. L. Pennington, Cleveland, Ohio.	James Davidson, Bay City, Mich.
Thomas Wilson, Cleveland, Ohio.	Alvin Neal, Port Huron, Mich.
John W. Moore, Cleveland, Ohio.	M. M. Drake, Buffalo, N. Y.
W. S. Mack, Cleveland, Ohio.	W. Bullard, Buffalo, N. Y.
David C. Carter, Detroit, Mich.	

## COMMITTEE ON LEGISLATION:

S. D. Caldwell, Buffalo, N. Y.	James Corrigan, Cleveland, Ohio.
James Ash, Buffalo, N. Y.	Wm. Livingstone, Detroit, Mich.
E. T. Evans, Buffalo, N. Y.	James Millen, Detroit, Mich.
P. P. Miller, Buffalo, N. Y.	Jesse Spaulding, Chicago, Ill.
John Gordon, Buffalo, N. Y.	C. A. Eddy, Bay City, Mich.
W. R. Ford, Buffalo, N. Y.	Alex. McDougall, Duluth, Minn.
Edward Smith, Buffalo, N. Y.	F. J. Firth, Philadelphia, Pa.
H. M. Hanna, Cleveland, Ohio.	

## SUBMARINE NAVIGATION.

Though many uses have been proposed for a perfectly reliable and practical submarine boat, its chief purpose would always be for use in war. The idea of constructing a vessel capable of being totally submerged, and which could thus attack a hostile ship in its weakest spot, namely, below the water-line, has induced many men to spend a great amount of time and money in attempting to invent and construct such a machine. Especially after the introduction of gunpowder, was the thought suggested how advantageous it would be if a large vessel, containing this explosive, could be fastened unobserved to an enemy's ship, for the purpose of blowing her up.

The time of the construction of submarine boats dates back to the reign of James I, of England, when Cornelius Debrell invented a submarine boat, which was tried on the Thames. Of the result of this invention little is known. Debrell's boat was built to carry 12 oarsmen and some passengers. We have only scanty information concerning its construction and steering apparatus.

The great problem of that time was the means of providing a constant supply of fresh air for breathing purposes. Several means have been tried to overcome this difficulty: 1. By carrying along in the vessel an amount of air, usually in a compressed state. In this case the time of submergence of the vessel is limited by the quantity of air taken along and the number of persons carried. 2. By keeping up a connection with the upper air, by means of a pipe and a float. In this case the supply of fresh air was of course unlimited, but the danger of accidents to the tube opposed a great difficulty to this manner of ventilation. The third method, that by which Debrell proposed to keep the air in the vessel fresh, was to use some kind of chemical, which he claimed to have discovered, by which the air in the boat could be kept constantly purified for re-use. This last method would be the best possible, but it is very doubtful whether Debrell really discovered such a chemical, and even if he did his discovery has been lost to us.

The lead given by Debrell was followed later by the Landgraf of Hesse, who tried a submarine boat, built on the same plan as Debrell's, but using the second method of ventilation. It was composed of a wooden tub of an elliptical shape, propelled by oarsmen, its

depth of submersion being regulated by the amount of water admitted into a compartment.

One of the difficulties of a submarine vessel is its instability; for when a vessel floats so that a slight increase or decrease in its weight will cause it to sink or rise, it is apt to lose its equilibrium, and exhibit a tendency to sink. This is perhaps the explanation of the accident to the vessel constructed by John Day in 1774, in which he went down but never rose again.

The man who first gave prominence to submarine warfare was David Bushnell, of Connecticut, who in 1775 constructed a submarine vessel, called the American Turtle, connected with which was a magazine of powder to be fastened to the enemy's ship. It was constructed of oak timber scooped out, so that it was said to resemble a huge clam. Iron bands gave it the necessary strength. To render it water-tight, the seams were calked and the whole machine covered with a coat of tar. Inside there was room for only one man, who propelled and steered the vessel, and fastened, moreover, the explosive case to a hostile ship's bottom. Entrance into the vessel was effected through a dome of metal, closely fitted to the structure, and provided with small glass windows, through which the engineer looked to direct his course. In order to keep the vessel upright, about 700 pounds of lead were attached to its bottom, 200 of which could be released instantly in case of an emergency. Rising was effected by force pumps, which removed the water from the compartments into which it had been admitted during the descent. The vessel was steered by an ordinary rudder in the rear and propelled by a screw propeller situated in front, worked by hand, while another screw from the top aided in upward and downward motions. The compass was provided with some pieces of shining-wood or fox-fire, off which the direction could be read even in darkness, while the depth of submersion was shown by a cork floating in a water gauge at the side of the vessel. The speed of this boat was about three miles per hour in still water. It was tried by Ezra Lee during the revolutionary war against a British man-of-war, but, owing to his inability to fasten the powder magazine to the ship, the trial was not considered a success.

Fulton was the next man to turn his attention to the subject of submarine navigation. His "Nautilus," tried in France, was a remarkable machine, both practicable and controllable. It was shaped much like an ordinary surface-boat, and had masts and sail, which could, however, be removed, and the whole boat submerged, in less than two minutes. The Nautilus was constructed of copper with iron ribs. Three men propelled it with paddles, and its apparatus for ascent and descent was like Bushnell's and under the control of the pilot. With this machine, Fulton placed a torpedo beneath a brig in Brest Harbor and succeeded in blowing up the ship, but his first attempt upon a man-of-war failing, Napoleon withdrew his support and Fulton went to England. There, however, his invention was rejected on the ground that, if such a vessel should be perfected, a weaker naval power might, by its aid, deprive England of her rank as mistress of the sea! Fulton, discouraged, seems to "have dropped the idea of submarine navigation," and we hear no more of it, a few impracticable projects excepted, until our civil war.

During that struggle a number of vessels were built by the Confederate government, vessels to be submerged with the exception of the hatchway and the funnel. They went under the name of Davids, probably from the Old Testament story of David and Goliath, in keeping with which large Northern vessels of war were expected to play the part of the Goliaths. The Confederate Davids carried, projecting from their bow, a long spar, on the end of which was carried a torpedo with a contact fuse. These vessels did considerable damage to the Northern fleet, and it was principally through them that the eyes of the nations were opened to the importance which submarine boats must play in future naval warfare.

After the close of the war many projects for submarine vessels made their appearance. One of the most novel of these was the Peacemaker, invented by Mr. J. H. Tuck, of New York. It was built of iron and steel and held a crew of two men, a pilot and an engineer. Its air supply was carried in a reservoir in a compressed state, while the rising and sinking was controlled by a system of horizontal rudders which could

be inclined at any angle. This boat had a speed of from four to five knots per hour, and at its trial in New York Harbor, in 1886, showed itself to be perfectly controllable under water.

The most noted submarine boats constructed since that time are the Nordenfolt boat of England, the Nautilus, invented by Mr. Andrew Campbell, also of England; the Peral, of Spain, and the Gymnote, of France. The peculiar characteristic of the Nordenfolt boat is the manner in which it was made to rise and sink. Several compartments are provided into which water is admitted until only its two turrets project above the surface. A pair of horizontal screws is then set in motion, which draw the boat down to the desired depth and keep it there by slowly revolving. If the screws are stopped, the boat rises at once to the surface. The motive power is steam.

In the Nautilus, built about 1886, by Mr. Andrew Campbell, the motive power is electricity, drawn from large storage batteries. The electricity is also used for lighting the interior by incandescent lamps.

The Peral was tried at Cadiz in 1890, and was quite satisfactory. In its general features it is much like the Nautilus.

The Gymnote is in several particulars different from the boats so far named. It has an arrangement by which the pilot can see what is going on above the surface while the boat is submerged as much as 50 feet. This arrangement is kept a secret, but is supposed to be a kind of camera obscura in a long tube with telescopic joints, which can be projected above the surface and, by a system of mirrors, reflects objects above the water level. The Gymnote's speed is said to reach 11 miles an hour in 45 feet of water.

The chief conditions which a practicable submarine boat must fulfill are—high speed, certainty of direction, invisibility and safety from enemy's fire. In addition it should be able to move not only on the surface but also in communication with the air, about three feet below it, and again at a greater depth, with all communication cut off. Other fundamental conditions are that it should be perfectly safe, easy to manage, and sure of action under all circumstances. These conditions were imposed by a circular, which was issued by the Navy Department at Washington in 1887, to stimulate invention in this line. Besides the above, other qualities were required, which it would be extremely difficult, not to say impossible, to combine in a single boat. Some of them were—a speed of at least eight knots per hour below and 15 knots above water; ability to fire torpedoes through the water; purification of the air so that it might remain at least 12 hours submerged; lighting of interior; ability to see object of attack; and the providing of a means of escape to the crew in case of disaster.

We will now sum up the qualities of different submarine boats, to show how many of these difficulties have been met.

1. A speed of 11 knots an hour was attained by the Gymnote, of France.

2. Air can be supplied by storing it compressed in a reservoir.

3. The problem of rising and sinking has also been solved, so that a vessel can now be sunk to any required depth and controlled perfectly under water.

4. Electricity furnishes light.

5. The camera obscura enables the pilot to see objects above the surface.

6. Electricity also furnishes the best motive power, and it is evident that it is the only practicable one, for it is impossible to use steam, as the products of combustion cannot be removed. Compressed air weighs too much, and, moreover, in expanding, lowers the temperature to such a degree as to freeze up the pipes. For electricity as motive power, the storage battery is especially useful, and the problem to-day is how to adapt it most perfectly to submarine boats. Its essential points must be extreme lightness with good storage capacity and freedom from the evolution of noxious gases in its discharge.

Such, then, are the characteristics of the submarine boat as it appears to-day. There seems no doubt that its perfection is near at hand, and that it will play an important part in the naval battles of the future, when the monstrous iron-clads of to-day may be approached and blown to pieces without danger to the attacking force.—E. A. Hoffman, in the Yale Scientific Monthly.

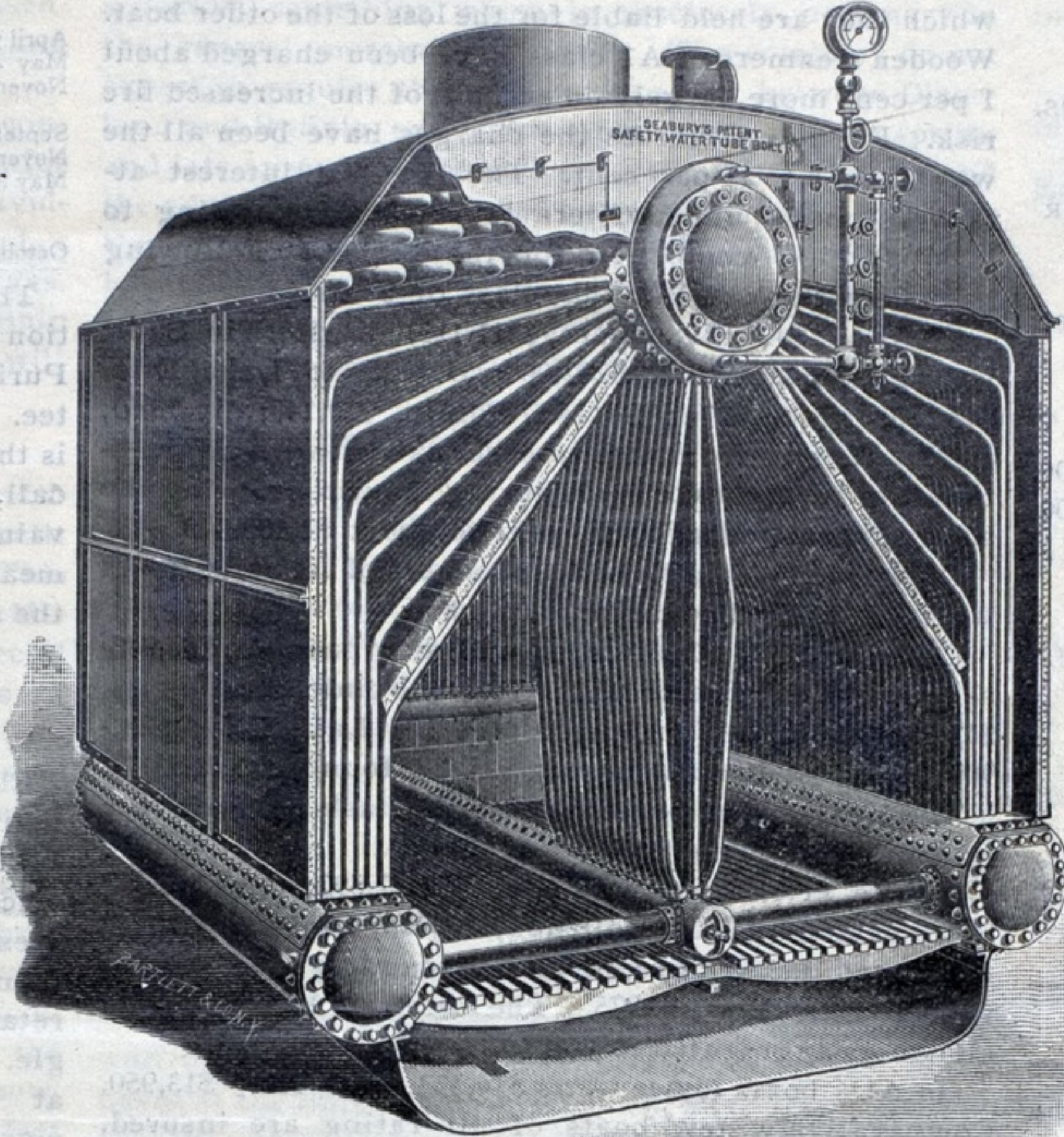


SEABURY'S SAFETY WATER-TUBE BOILER.

(SEE ILLUSTRATIONS.)

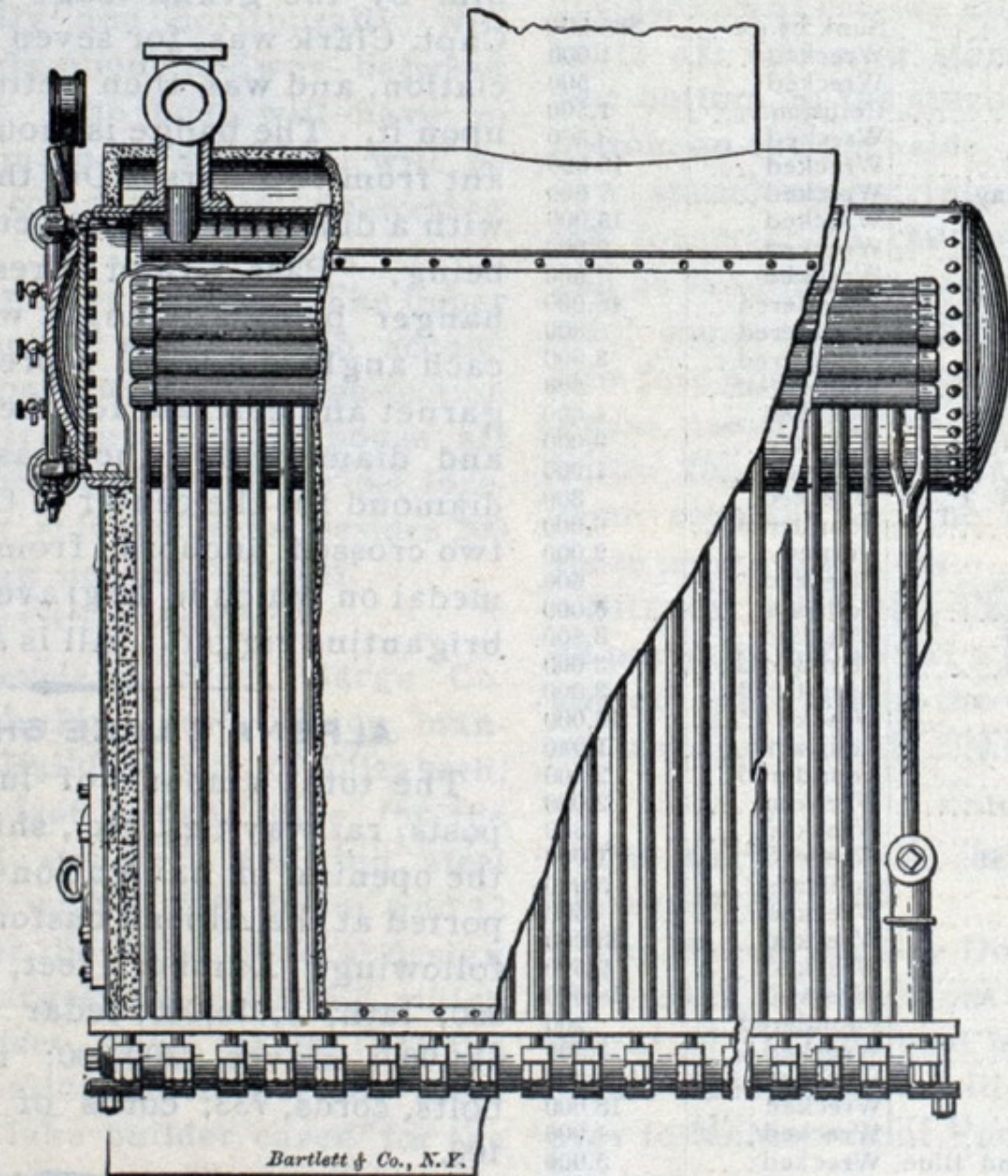
The builders of the steam generator represented in the illustration have furnished the following description: "This water-tube boiler, having so many good qualities and having proved so very satisfactory in every instance where it has been placed in boats, and being designed and constructed after considerable experience with a number of water-tube boilers, is offered to the public with earnest belief that it is the freest steaming and longest lived boiler in use to-day; all the claims made for the boiler have been proved by actual tests. With the degree of skilled labor and manufacturing facilities employed in its construction, the very best results are obtained. It has been approved by the Board of Supervising Inspectors, and is built to conform with their rules and regulations. The material throughout is of the best; steel in drum and tube plate is 60,000 T. S. Tubes are of the best charcoal iron or steel. Each and every piece used in this boiler is carefully inspected and tested before being placed in position, and again tested to 600 lbs. hydrostatic pressure after the parts have been assembled. There are a great many seemingly well designed boilers that have proved unsatisfactory for the reason that there have been no means of cleaning soot and ashes off the tubes, and it is a well-known fact that boilers deteriorate more from corrosion than from actual wear in use. Of course, there are a few boilers that never reach the corroding point, having proved useless before they had time to corrode out. The object sought for most in the designing was to have a boiler arranged in such a manner that without much work it could be easily kept clean both internally and externally, and as the weight of boiler is carried from tube plate, independent of the lower half manifold, it is an easy matter to remove the cap nuts, taking off steel straps and removing half manifolds. This can be done by working from ash pan, as the sides of same are made so they can be removed; also taking off drum head. It is then possible to pass a wire brush through these tubes from drum, and all dirt will be carried down with brush. It is also possible to look through tubes by lowering a small electric light in the tube to the bend, from upper end, and looking up from lower end, then reversing the operation and looking down from upper end, as drum is sufficiently large to admit a person going inside, thus insuring the inside of tubes being clear of all the scale, grease or dirt. As the tubes are placed in rows at right angles to each other, it allows the use of a scraper or small bellows being used between them to remove any dirt, soot or ashes; the tubes can then be given a coat of zinc paint to protect them from corrosion (this is usually done at the end of the season). There is more effective heating surface in this boiler than in any other made, where dimensions of casing are the same. The ratio of heating surface to grate surface is more than the average boiler, and is what experience has shown to be right. This boiler is not the lightest one made, but is as light as is consistent with long life; but where light weight is desired, it can be built to compare with the lightest. Openings are provided in front of the casing at feed water heater, and the feed water heater is spaced so that steam pipe with perforated end and hose can be used between them their entire length and width, for blowing off soot and ashes, thereby insuring clean heating surface and free draught, which will give

the most economical results. All boilers from four feet wide and upwards have the tubes expanded at both ends, and tube plate is of sufficient thickness to stand the pressure without the need of stay bolts. A hand-hole plate is placed at one end for cleaning half manifolds. The joint at tube plate and half manifold is that known as the rebate joint, packed with asbestos, and as this joint is so well known, it is not necessary

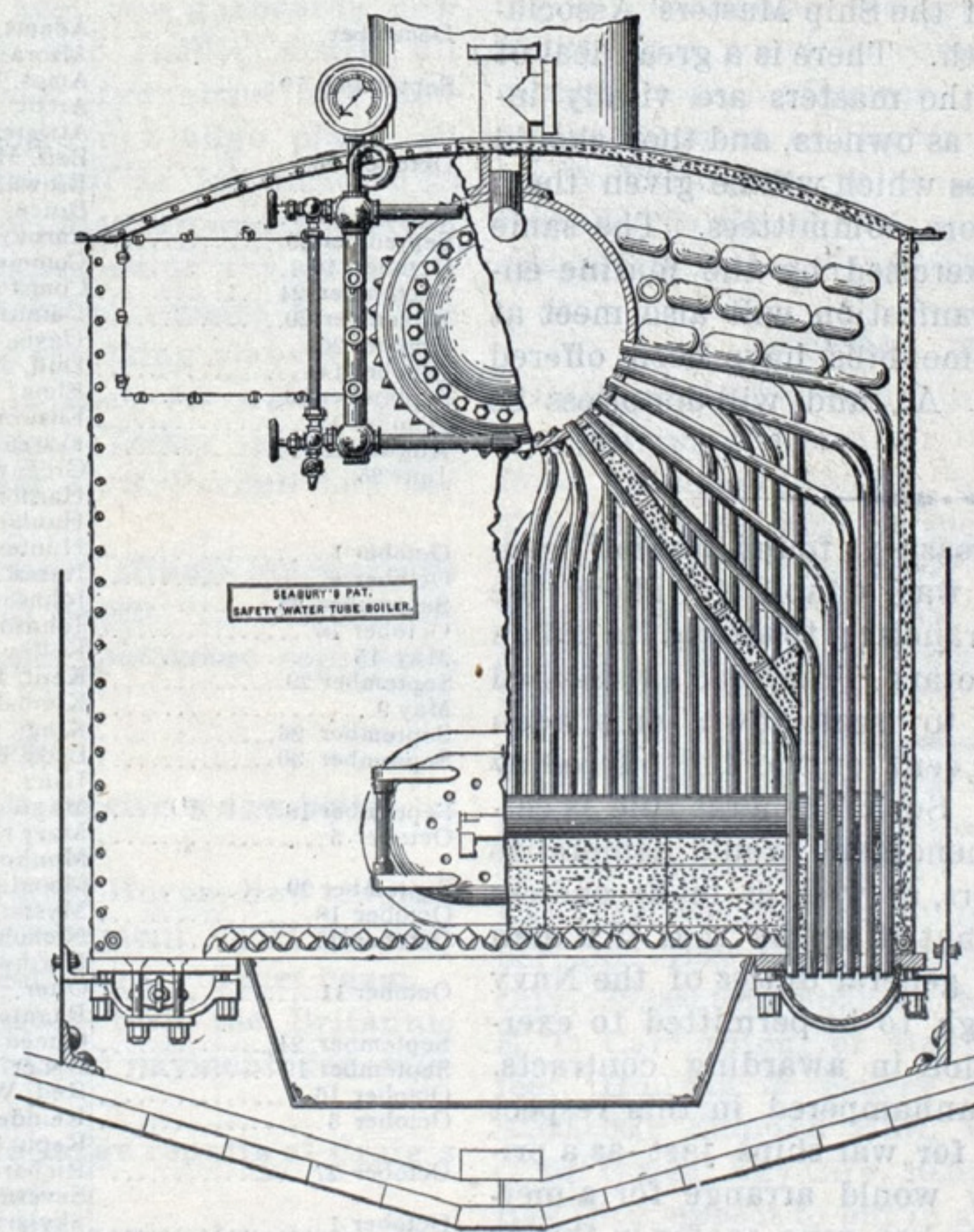


THE SEABURY BOILER.

to dwell on its merits here; it is used in boilers from four feet wide to eight and nine feet wide, any length. Above eight and nine feet wide, a drum of a size large enough to allow a workman going inside to expand tubes, etc., is used at sides of boiler, instead of half manifold; also a central cluster of tubes are added, making two furnaces instead of one. Below four feet in width the lower manifolds are of a forged steel pipe sufficiently thick to stand the pressure without chang-



Bartlett & Co., N.Y.



CHARLES L. SEABURY'S PATENT SAFETY WATER-TUBE BOILER.

ing its shape, and the tubes, which are steel, are secured in position by right and left machinery steel extension pieces at both ends of tubes, one end of lower manifold is arranged to be taken off for cleaning out dirt. These boilers are constructed by Charles L. Seabury & Co., Nyack, N. Y.

IN THE ENGINE ROOM.

CUTTING A GASKET.

The inexperienced engineer who tries to cut a gasket by first marking it out with a rule and dividers and then spaces off and lays out the holes is very clearly "not in it" with the man who understands his business, says Tradesman. That man will not try any measuring or spacing business, but will place the sheet or rubber on the flange it is to fit and with a small, round faced hammer he will go lightly over each line of surface boundary, both curved and straight. He will tap lightly so as not to strike through the rubber cloth and damage the iron work, yet the blows are heavy enough to cut the fabric nearly, if not quite in two. If there are several holes or a more or less complicated outline to be cut, he will first cut one or two of the bolt holes, then put bolts or tightly fitting pieces of wood in the holes cut to hold the gasket in place while he is cutting the balance of the way around. In this manner the gasket is cut out exactly to the shape of the surface upon which it is to be placed, and that, too, without the trouble of measuring, using dividers or maintaining a knife sharpe enough to cut rubber. The only requirement is to strike light with the hammer, so as not to injure the corners of the iron.

DON'T FOOL WITH MOVING MACHINERY.

I have seen more injuries received from attempting to tighten some moving part of an engine than from any other source, and it is strange what men will attempt to do. I had an engineer once whom I was compelled to discharge, because he was forever adjusting the engine when under motion; he would tighten or loosen eccentric straps, adjust the length of the eccentric rod, the valve stem, or try to tighten the crank pin brasses, with the result that he was forever getting a bang on the head with a wrench that was knocked out of his hand and the engine was crippled again and again. Let moving machinery alone. If it needs repairs it needs them enough to stop for a time, and if it does not need them then "bide a wee."—Dixie.

LITERARY NOTES.

The first number of the new volume of Harper's Weekly (the number dated January 4, 1896) will contain the opening chapters of a new serial of a Scotch feud of the latter part of the sixteenth century, by S. R. Crockett, author of "The Raiders," etc.

The opening paper in Harper's Magazine for February will be one on "The New Baltimore," by one of the most prominent of the city's younger residents, Stephen Bonsal, Jr. The article will be fully illustrated from drawings by Harry Fenn. Caspar W. Whitney will continue his account of his journey to the Barren Grounds of Canada, giving an interesting glimpse of the Northwest. Theodore Roosevelt will tell the story of St. Clair's disastrous campaign a century ago, and Henry Loomis Nelson, in "The Passing of the Fur Seal," will make clear the truth about a celebrated international dispute.

President Andrews' history will be continued in Scribner's Magazine until April. The publishers announce that the concluding four installments are even more interesting than the preceding, and that the illustration increases in quantity and attractiveness. The serials and short stories will prove fully up to the standard.





ESTABLISHED 1878.

PUBLISHED EVERY THURSDAY AT 144 SUPERIOR ST.,  
(LEADER BUILDING), CLEVELAND, O.GEO. L. SMITH, } PROPRIETORS.  
IRVING B. SMITH, }

WILLIAM L. McCORMICK, } EDITOR.

## BRANCH OFFICE.

CHICAGO, ILL., 238 Lake Street.  
THOMAS WILLIAMS, Associate Editor.

## SUBSCRIPTION.

One copy, one year, postage paid, \$2.00.  
One copy, one year, to foreign countries, \$3.00.  
Invariably in advance.

## ADVERTISING.

Rates given on application.

All communications should be addressed to

SMITH &amp; SMITH,

144 Superior Street,

CLEVELAND, O.

Entered at Cleveland Postoffice as Second-Class Mail Matter.

CLEVELAND, O., JANUARY 2, 1896.

THERE is such unanimity of opinion in regard to the need for placing dams at the foot of Lake Erie in order to bring the level up to the point necessary for safe and profitable navigation that Congress will undoubtedly give it the attention it deserves. Senator Brice is conducting the campaign in the Senate, and Mr. Griswold of Pennsylvania finds all the Congressmen of the lake region heartily with him in his championship of the same end. While local appropriations will undoubtedly be cut down the more on this account, yet the proposed improvement will prove of such general benefit that this can well be suffered.

THERE should be an extra large turnout of the lake captains at the grand lodge of the Ship Masters' Association at Washington this month. There is a great deal of legislation pending in which the masters are vitally interested both as captains and as owners, and they should make the best of opportunities which will be given them in the shape of hearings before committees. The same diligence should also be exercised by the marine engineers, whose national organization will also meet at the capital this month. Some bills have been offered directly from the M. E. B. A., and will doubtless be looked after.

THE Secretary of the Treasury found himself confronted by precedent, and was unable to allow the Union Iron Works, of San Francisco, to amend its bid on the battleship, because Secretary Tracy had established a rule which allowed bidders to "scale down" only when their bid came within 3 per cent of the bid offered by the successful competitors. Such a general rule is certainly wise, as unlimited amendment would demoralize business for the ship builders, as well as make endless trouble for the government; but it seems that if a man is capable of performing the general duties of the Navy Department, he knows enough to be permitted to exercise some personal discretion in awarding contracts. The British Admiralty is unhampered in this respect and is permitted to bargain for war ships just as a private individual or company would arrange for a merchant vessel. The Admiralty has gone so far in this as to draw upon itself the just criticism of the marine press of England, because one builder is to receive several thousand pounds less for building a war ship than is another builder, in a different locality, for a duplicate vessel. It might, however, be to the interest of American shipping interests, both constructive and commercial, if the government were allowed to exercise the freedom of an individual in bargaining for war vessels,

## LAKE DISASTERS OF 1895.

There occurred during the past season about 1,000 casualties on the lakes which have occasioned losses of amounts large enough to enter into recapitulations of underwriters. During the past season steel boats have been insured at from 2½ to 3 per cent of their value on yearly policies, covering not only losses to which they may be subjected, but also for liability for collisions, in which they are held liable for the loss of the other boat. Wooden steamers of A1 class have been charged about 1 per cent more, largely on account of the increased fire risk. For lower classes the charges have been all the way from 6 to 15 per cent. The greatest interest attaches among underwriters to steel boats, owing to keen foreign competition for these risks. Following have been the losses on that class of boats.

Collision, \$421,869; ashore, \$211,118; disasters in Sault passage, \$154,879; fire, \$232,000; Detroit to Lake Erie, \$48,150; aground at Grosse Pointe, \$20,140; disabled, \$9,930. Losses from various other causes, with a fair estimate of repairs to be made during the winter, bring the total on steel boats for the year to about \$1,100,000.

On wooden steamers and schooners of A1 class losses were \$529,514. The main items were:

Collision, \$167,082; disasters in Sault passage, \$98,943; ashore, \$74,496; fire, \$52,325; Grosse Pointe strandings, \$43,742; strandings in Detroit river to Lake Erie, \$28,909; disabled, dismantled, etc., \$25,931; foundered, \$85,000.

The losses on A2 boats from going ashore form the largest item. The list is:

Ashore, \$146,650; Grosse Pointe, \$7,592; mishaps in Sault passage, \$52,017; collision, \$65,918; disabled, \$22,908; foundered, \$53,500; fire, \$60,875; groundings in Detroit river to Lake Erie, \$6,975. The losses on A2 boats from all causes aggregated \$374,458.

On A1½ boats losses were \$44,322, and A2½ \$13,950. Comparatively few boats of B1 rating are insured, owing to high rates. Estimates on that class are \$32,493.

The grand total of losses on boats reached \$2,096,697, divided as to cause, as follows:

Collision, \$667,369; ashore, \$476,914; disasters in Sault passage, \$301,429; fire, \$346,445; strandings from Detroit to Lake Erie, \$140,611; disabled, \$70,777; Grosse Pointe strandings, \$71,374.

A list of total losses of lake craft of the various classes, valued at about 1,300,000, follows:

## SCHOONERS.

DATE.	NAME.	CASUALTY.	VALUE.
December.....	Adams, G. W. ....	Sunk by ice ..	\$85,000
September 19.....	Alzora (Br.).....	Wrecked .....	1,000
	Ames, S. I. ....	Wrecked .....	500
	Arctic.....	Collision .....	1,500
	Atwater, S. T. ....	Wrecked .....	3,500
October 26.....	Bell, Mattie C. ....	Wrecked .....	10,000
	Brown, Ida May.....	Wrecked .....	600
October 20.....	Bruce, B. F. ....	Wrecked .....	15,000
September 29.....	Carney, R. J. ....	Wrecked .....	2,000
October 16.....	Commerce.....	Wrecked .....	7,000
September 24.....	Comstock, A. W. ....	Foundered.....	45,000
November 20.....	Dauntless.....	Foundered.....	800
October 26.....	Davis, G. W. ....	Foundered.....	5,000
October 14.....	Duff, Nellie A. ....	Foundered.....	800
September 30.....	Elma.....	Wrecked .....	4,000
October 19.....	Ellsworth, Col. ....	Wrecked .....	3,000
August 22.....	Ferret.....	Collision .....	1,000
June 25.....	Greenwood, W. T. ....	Wrecked .....	300
	Hartford.....	Foundered.....	6,000
	Hanlan.....	Burned.....	2,000
October 1.....	Hunter, Elvina.....	Wrecked .....	600
October 6.....	Itasca.....	Collision .....	5,000
September 23.....	Johnson, C. H. ....	Wrecked .....	3,500
October 16.....	Johnson, C. N. ....	Foundered.....	3,000
May 15.....	Kelley, Kate.....	Foundered.....	3,000
September 23.....	Kent, H. A. ....	Wrecked .....	16,000
May 9.....	Kimball, S. H. ....	Collision .....	1,000
September 26.....	King, C. A. ....	Foundered.....	2,500
September 30.....	Lady Franklin.....	Wrecked .....	2,000
	Luna.....	Wrecked .....	300
September 18.....	Magruder, J. H. ....	Wrecked .....	1,000
October 5.....	Mary (Br.).....	Collision .....	5,000
	Monitor.....	Wrecked .....	500
September 29.....	Moonlight.....	Wrecked .....	23,000
October 18.....	Mystic.....	Wrecked .....	2,500
October 26.....	Nicholson, E. A. ....	Wrecked .....	18,000
	Northwest.....	Foundered.....	200
October 11.....	Otter.....	Wrecked .....	1,500
	Phantom.....	Wrecked .....	300
September 24.....	Queen City.....	Wrecked .....	18,000
September 10.....	Raber, John.....	Wrecked .....	1,000
October 16.....	Red, White and Blue.	Wrecked .....	5,000
October 6.....	Reindeer.....	Wrecked .....	1,000
	Reput lic.....	Foundered.....	2,500
October 27.....	Richards, H. C. ....	Foundered.....	17,000
	Severn.....	Wrecked .....	5,000
October 1.....	Skyline.....	Wrecked .....	2,500
September 23.....	Williams, E. R. ....	Foundered.....	2,000
	Worts, J. G. ....	Wrecked .....	6,500

## TUGS.

DATE.	NAME.	CASUALTY.	VALUE.
December 7.....	Campbell, P. B. ....	Foundered.....	\$4,000
June 6.....	Everson, John.....	Collision .....	4,500
December 15.....	Roy, R. T. ....	Sunk by ice.....	12,000
	Wells, C. W. ....	Burned.....	7,000

## STEAMERS.

DATE.	NAME.	CASUALTY.	VALUE.
	Africa.....	Foundered.....	\$12,000
October 26.....	Allmeninger, J. M. ....	Wrecked .....	8,000
September 26.....	Barker, Grace.....	Burned .....	8,000
August 24.....	Burlington.....	Burned .....	12,000
May 11.....	Cayuga.....	Collision .....	225,000
January 21.....	Chicora.....	Sunk by ice.....	115,000
	Cibola.....	Burned .....	127,000
	Dominion.....	Wrecked .....	1,500
April 29.....	Everett, A. ....	Sunk by ice.....	50,000
May 4.....	Fairbank, N. K. ....	Burned .....	30,000
November 22.....	Groh, Michael.....	Wrecked .....	9,000
	Johnson, J. H. ....	Wrecked .....	3,000
September 29.....	Kershaw, C. J. ....	Wrecked .....	45,000
November 4.....	Missoula.....	Foundered.....	95,000
May 31.....	Norman.....	Collision .....	160,000
	Otego.....	Burned.....	8,000
October 26.....	St. Magnus (Br.).....	Burned.....	35,000
	Sheriffs, Jim.....	Wrecked.....	80,000

The old year's record ended with the practical destruction on Tuesday by fire of the Graham & Morton steamer Puritan, which was lying in winter quarters at Manistee. She burned to the water's edge, and her machinery is thought to be ruined. She was built in 1887 by Randall, of Benton Harbor, at a cost of \$70,000, and was valued in last year's Lloyds at \$30,000, rating A 1½ and measuring 163 tons net. She was one of the fastest of the smaller class of steamers and was fully insured.

## THE SHIP MASTERS' ASSOCIATION.

## CLEVELAND LODGE.

Cleveland Lodge No. 4, of the Ship Masters' Association met in regular weekly session at their rooms on Water Street last Friday, and elected the following officers for the year; president, J. A. Holmes; first vice president, Richard Neville; second vice president, William Cumming; treasurer, Thomas Jones; financial secretary, W. W. Brown; recording secretary, Robert Pringle. Delegates to the grand lodge, which will be held at Washington, January 22, will be appointed tomorrow.

The lodge took action formally protesting against any changes in the laws governing fog signals, and instructed the secretary to forward to Congressmen Burton and Beach notice of their action.

Captains W. A. Collier, Clint Ennes, C. E. Benham, Charles Wallace, John McNeff, Robert Pringle, and Richard Neville were appointed a committee of arrangements for the annual ball.

## CAPT. CLARK'S MEDAL.

Capt. Alex Clark, who was the first president of the Ship Masters' Association, and who is practically its founder, has received the gold medal badge voted to him by the grand lodge at its last annual meeting. Capt. Clark was for seven years president of the association, and was then retired only because he insisted upon it. The badge is mounted on red silk and is pendant from two bars. On the upper bar is a rising sun with a diamond in the center, the legend on the bar being, "Past Grand President, S. M. A." and the hanger being a triangle with a sun in the center. At each angle is a jewel representing the nautical colors—garnet and emerald for the port and starboard lights, and diamond for the masthead lights, with a larger diamond for the center of the sun. The lower bar bears two crossed anchors, from which is suspended a large medal on which is engraved the figure of a steamship, brigantine rigged. All is solid gold except the jewels.

## ALPENA'S LAKE SHIPMENTS FOR 1895.

The total amount of lumber, shingles, lath, cedar posts, railway ties, etc., shipped from this port, since the opening of navigation in 1895, by vessels that reported at the Alpena custom house, is contained in the following: Lumber, feet, 124,878,000; shingles, 11,425,000; lath, 8,916,000; cedar posts, 658,500; railway ties, 614,900; staves, 300,000; telegraph poles, 7,900; pail bolts, cords, 733; cords of cedar, 760; tan bark, cords, 100.

## LIEUT. BLOW'S SUCCESSOR.

Lieut. Charles S. Ripley, of the United States navy, is appointed successor to Lieut. Blow as officer in charge of the hydrographic department of the Great Lakes. Lieut. Ripley comes from coast survey schooner Ergre. He was appointed naval cadet in 1875, midshipman in 1881, ensign in 1883 and lieutenant in 1891.

THE citizens of Brooklyn have raised \$10,701.57 to purchase a silver service for the cruiser Brooklyn. Designs will be submitted on January 15.



## SHIP BUILDING AND REPAIRS.

## NEW WORK.

The award of more lake contracts during the past week has not closed operations in this line for the winter. It is almost certain that the Graham & Morton Co., whose fleet has suffered the loss of another steamer, will be on the market in a short time for a new passenger boat of moderate dimensions, but of high speed and finish.

John Craig & Sons, of Toledo, have been given a contract by the Lake Michigan Car Transportation Co., for two more barges of the style built by Capt. James Davidson last season. The Craig yard will also turn out a powerful tug during the winter, to tow these barges. The latter will be equipped with the American Ship Windlass Co.'s, automatic towing machines, and will carry about thirty loaded cars each.

## THE F. &amp; P. M. CAR FERRY.

F. W. Wheeler & Co., of Bay City, were the successful bidders on the steel car transport which is to be built by the Flint & Pere Marquette Railway Co. This steamer will operate between Ludington, Mich., and Menominee, Wis., and will be constructed with a special view to operating through the thick ice which forms on Green Bay. She will be built according to designs prepared by Mr. Robert Logan, of Cleveland, who will also superintend her construction. She is intended to carry about 28 cars, and is to be 350 feet long over all, 331 feet keel, 56 feet beam and 19½ feet molded depth, with depth, from upper deck to floors of 37 feet. She will have three fore-and-aft compound engines, of equal power, with cylinders 24 and 48 inches by 36 inch stroke. Two of these will operate the iron screws at the stern, and the third will operate the ice breaking screw at the bow. Steam will be generated by four boilers, each 13½ feet in diameter and 12 feet long. The wheels aft will be 11 feet in diameter and that forward 9½ feet in diameter. The main shafts will be housed in as on the Northern Line passenger steamers and the new Cunarders, making them accessible at all times. Especial attention is paid to giving the greatest strength possible in construction, and 2,500 tons of steel will be used in hull construction. The bottom will be built on the cellular system, with frames and plating extending from bilge to upper deck. The bow will be double-plated for 30 feet abaft the stem with ¾-inch plating, to extend 3 feet above the load line. To prevent the bows being crushed in by contact with the heaviest ice channel beams, thoroughly secured both vertically and horizontally, will span the hull at close intervals about midway between the floors and the main deck. The boat will have no water bottom, but below the main deck the hull will be divided into six water-tight compartments, answering the same purpose.

The upper and main decks will be of steel. The upper works will be of wood, and include a cabin with accommodations for twenty-five passengers, in connection with the pilot house, texas, etc., and another house aft for crew's quarters. The smokestacks will be set fore-and-aft. The boat will carry 30 loaded cars, besides 200 tons of fuel and will then draw not over 13 feet.

## THIRTEEN STEEL CANAL BOATS.

The directors of the Cleveland Steel Barge Co. closed a contract Friday with Mr. Lewis Nixon, manager of the Crescent Ship Building Co., of Elizabeth, N. J., as was predicted in last week's issue, for the construction of three steel steamers and ten steel barges, all to be 100 feet long with 18 feet beam and 12 feet molded depth, much after the same general design of the steamer Alpha and barges 1, 2, 3, 4 and 5, which form the company's initial fleet. It is stated that the price which the seaboard builders will get for these boats is a figure at which no lake builder cared for the contract under any circumstances. The contract for the first six boats of the line fell far short of being a bonanza to the Globe Iron Works Co., and its bid on the second contract was considerably higher in proportion than on the first. The coast company had an additional advantage, also, in that it will be enabled to deliver some of the boats at New York during the winter and they will have ample time to load freight according to the very leisurely Gotham idea before the Erie Canal is opened in the spring.

The plan, as before stated, is to place more power in the new steamer than the Alpha had, and to tow only

three consorts instead of five. Three barges will lie at New York, discharging and loading cargoes, and when one of the steamers arrives with three barges in tow she will discharge and reload as rapidly as possible, and will then start on her return trip with the three loaded barges, leaving the three she had taken down, which will be picked up several days later by the next steamer. This will enable the company to live up to a schedule, something which is absolutely necessary in the general merchandise trade. The company do not expect to require the services of a tug between Cleveland and Buffalo, except for a few trips in early spring and late autumn. The steamers will have 220 h. p. and the additional draft allowed by two feet added depth to the hulls will increase the carrying capacity of the boats as soon as the improvements on the Erie Canal allow them to take advantage of it.

The Union Dry-dock Co., Buffalo, has begun work on a \$60,000 side-wheel passenger steamer for Lake Chautauqua, to be 215 feet long, 32 feet beam, and 9½ feet deep.

D. W. Runnels, of Port Huron, has laid the keel for a new tug of the dimensions of the tug Kittie Haight, recently seized from her Canadian owners, and which has a gross tonnage of 70. The new tug will be fitted with the Haight's machinery.

The steel steamer building at South Chicago for Arthur Orr, C. W. Elphicke and others will be named the George Orr. The work on the ship does not progress very rapidly. Manager Babcock complains that it is impossible to obtain material as fast as it is needed.

## GENERAL REPAIR WORK.

The work on the steel boats in Cleveland is pretty well finished. The steamer Victory is in the north basin at the Ship Owners' dry-dock, having her bottom painted and getting new fender strakes. Two of her top-side plates will be taken off and re-rolled while she is in the dock. The Wallula is receiving her extensive repairs in the south basin.

At the Cleveland dry-dock the Castalia completed repairs and left the dock this week, her place being taken by the Roman, which has one plate to be repaired. The Parks Foster will then be docked.

CHICAGO.—At the Chicago Ship Building Co.'s shipyard the steamer Fedora went out of dry-dock and the steamer E. M. Peck went in to receive a new wheel and some general repairs.

At Miller Bros.' shipyard the schooner Michigan, in dry-dock, will receive all new keel, new garboards, new cants aft and new stern post and rudder; nearly all new bottom on the starboard side and about half new bottom on the port side, and some new bilge plank; all new stanchions, stringers and rail as far forward as the foremast on the port side, also around the stern and as far forward as the mizzenmast on the starboard side; some new deck; considerable repairs to cabin; new fore and main booms; and recalking all over. The steam canal boat Pallas is in dock for a general rebuild; the steamer Charlemagne Tower is receiving some repairs; and the steamer C. S. Parnell had her three masts taken out.

SHEBOYGAN, WIS.—The schooner Minnie Mueller will be partially rebuilt at a cost of \$4,000. In her rebuilt and enlarged shape, the schooner Quickstep represents an investment of \$7,500.

## REPAIR NOTES.

The tug Surprise (Br.) will receive a new boiler at Massey, Ont.

The Wolverine Dry Dock at Port Huron, has shipped the second life-boat on its government order to Seabright, N. J. The boat is 30 feet long by 8 feet beam.

The underwriters will probably turn the Britannic over to McMorran of Port Huron, in payment for raising her.

The Ira H. Owen will receive large repairs at Craig's yard, Toledo, during the winter.

The steamer St. Joe is in the Wolverine dry-dock, Port Huron, for a general overhauling after her seige in the ice.

A contract for putting six steel furnaces in the steamer Charles A. Eddy at Chicago has been let to the National Boiler Works of Bay City, Mich.

The Joe Milton (Br.), recently secured in trade by Mr. Crawford, of Warton, Ont., has already been taken to that port, and will be cut down to a tug this winter.

## THE WEEK'S LITIGATION.

The assignment of admiralty cases in the United States District court sitting at Detroit is as follows:

## JANUARY 2.

- 3,875—Thomas Murphy vs. tugs Sea Gull and Waldo Avery.
- 3,908—S. B. Grummond vs. schooner Mineral State.
- 3,909—S. B. Grummond vs. schooner E. R. Williams.
- 3,915—Charles Frazer vs. schooner Emma C. Hutchinson.

## JANUARY 3.

- 4,028—Samuel F. Hodge & Co., vs. steamer Samuel Marshall.
- 4,132—Byron Whitaker et al. vs. the Wheeling & Lake Erie Coal Co.
- 4,197—Luther L. Slyfield vs. 98 cords No. 1 limestone.
- 4,224—William Garlarus vs. schooner S. P. Ames.

## JANUARY 4.

- 4,237—Star Line of steamers vs. steamer Riverside.
- 4,249—John Elsey, Jr., vs. steamer State of Michigan.
- 4,343—Hans Krause and Mark H. Hanlon vs steamer F. & P. M. No. 2.

## JANUARY 6.

- 4,366—James Knaggs vs. tug Dan Runnels.
- 4,372—Abram & Angus M. Smith vs. steamer Maud Preston.
- 4,438—U. Grant Grummond vs. Abram Smith et al.
- 4,465—C. A. Eddy et al. vs. the Northern S. S. Co., libel and cross libel.
- 4,396—Joseph Kinsel vs. steamer Maud Preston.

## JANUARY 8.

- 4,443—Allen C. McLean et al. vs. steamer Northern Wave.

## JANUARY 9.

- 4,457—U. Grant Grummond and others intervening vs. steamer Burlington.
- 4,458—A. F. Bartlett & Co., vs. steam dredge No 6.
- 4,476—Albert Waller and others intervening vs. steambarge S. Neff.

## TESTIMONIALS FOR THE CASE WHEEL.

Mr. A. Wells Case, patentee of the Case outward thrust propeller wheels, is sending out a new circular full of testimonials from firms and individuals who have given this wheel a trial. Among these are good words from Messrs. Ed. R. Ladew and W. Frank West, of New York; Bell Bros., of Alton, Ill.; L. L. Moses, Syracuse, N. Y.; W. H. Russell, Woburn, Mass.; P. T. Buckley, treasurer of the I. J. O. C. A., Hartford, Conn.; C. K. Mead, president Des Moines River Boat Co., Des Moines, Ia.; Clay & Tobensen, Gloucester City, N. J. Mr. Case put a wheel on the lake steam yacht Bonita, owned by Mr. Mark Hopkins, increasing the speed more than 5 per cent. In the wheels which Mr. Case has substituted for those of other makes, according to this circular, the average increase has been over 6½ per cent, which is equal to several times that percentage in gain of power. This wheel is manufactured by the patentee, at Highland Park, Conn.; by the Harlan & Hollingsworth Co., Wilmington, Del.; the Globe Iron Works Co., Cleveland; S. F. Hodge & Co., Detroit and the Bertram Engine Works, Toronto, Ont.

## VESSEL TRANSFERS.

Papers have been filed in the custom house at Detroit transferring the steamer George W. Roby from the Roby Transportation Co., to F. W. Wheeler for \$75,000. The price is to apply on the 400 footer building at the Wheeler yard for the Roby Transportation Co. F. W. Wheeler & Co. have since transferred the Roby to W. S. Mack and others of Cleveland, the consideration being \$90,000.

The following Saginaw Valley firms are getting on logs in Georgian Bay this winter, which will be taken over in rafts next season: Saginaw Lumber & Salt Co., Bay City, about 25,000,000 feet of timber; Central Lumber Co., Bay City, 15,000,000; Fisher & Turner, Bay City, 35,000,000; Spanish River Lumber Co., of which E. T. Carrington, of Bay City, is manager, 28,000,000 feet; Holland & Emery Lumber Co., East Tawas, 50,000,000; Edmund Hall, Bay City, 12,000,000 feet; S. G. M. Gates, Bay City, 10,000,000; J. W. Harvey & Son, Bay City, expect to put in about 40,000,000 feet for their mill at Fenelon Falls, Ont.

A fine quality of iron ore has been discovered within the limits of Marinette, Wis., only a few feet below the surface of the ground, on land owned by the North Ludington Co. Investigation will be started at once, and if the vein is a good one a shaft will be sunk. A good quality of copper has also been found in the vicinity, and Marinette's prosperity may not die out with the forests.



## CORRESPONDENCE.

We do not hold ourselves responsible in any way for the views or opinions expressed by our correspondents. It is our desire that all sides of any question affecting the interests or welfare of the lake marine should be fairly represented in THE MARINE RECORD.

## HOW TO PROTECT CHICAGO.

To the Editor of The Marine Record:

The problem of protecting Chicago against an invasion by water is easy of solution. The lakes Ontario, Erie, Huron and Superior are owned partly by Great Britain, and partly by the United States, and therefore liable to invasion by the first named power, at any time and from any point. But Lake Michigan is entirely a United States lake and there is no part ownership of it. Its connection with Lake Huron, and thus with all the other Great Lakes, is effected through the Straits of Mackinaw, consisting of three channels, the north and the south channel, and the middle or Mackinaw channel. The latter is very narrow, at some points only a few hundred yards wide. The north channel is  $2\frac{1}{4}$  miles wide at its narrowest points, and the south channel  $3\frac{1}{4}$  miles. The three channels unite between old Fort Mackinaw Point and Point la Barbe, forming the main entrance, being  $3\frac{1}{2}$  miles wide, and partly obstructed by shoals. When the main entrance is closed, or the three channels are closed, Lake Michigan is hermetically sealed up, and no vessel of any kind can enter.

The problem of protecting Chicago, therefore, narrows down to closing up the Straits of Mackinaw by impregnable fortifications. Such fortifications will not only protect Chicago, but whole Lake Michigan with its towns and cities; and make this lake in case of war, a secure place of refuge for all the United States tonnage on the Great Lakes; and, last but not least, converts Lake Michigan into a navy yard of enormous proportions, as an offset to Georgian Bay, the natural navy yard of Great Britain on the lakes. The diversified great interests of the city of Chicago; of all the cities and towns on Lake Michigan; of all the shipping on the Great Lakes; of the Federal government to have a base of operation for a navy on the lakes, all these great interests, severally and conjointly, demand fortifying the Straits of Mackinaw by works of the most formidable construction.

In modern warfare the old style fortifications are played out. A war with one of the great European powers at present means something more than a war with Indians, or war in colonial days. A single fort amounts to nothing if not supported by other forts. The mutual support of several forts is the prominent feature of modern fortification, which in its simplest form is represented by three forts mutually flanking one another, affording within the triangle they represent sufficient space for a whole army to camp, and at a moment's notice sally forth to take the field. In naval warfare the principles of offense and defense are the same as on land, war vessels taking the place of the army.

The defenses of the Straits of Mackinaw have therefore to consist of a double and treble line of fortifications supporting one another according to circumstances. To protect the main entrance between old Fort Mack-

inaw Point and Point la Barbe, a fort at each of these points and at McGulpin's Point will form the basis of defense. To protect the north channel four forts, two on each side within the reach of one another, are required; the inner forts to be at Point St. Ignace, and opposite it at the west point of Mackinaw Island. To protect the south channel also four forts are required, two on each side, the outermost being at Point au Sable, and opposite it on Bois Blanc Island, each of them supported by a fort in rear. For the middle channel at Mackinaw, a main fort on Round Island, with flank works on Bois Blanc and Mackinaw Island will be necessary. These forts, nearly all located at the narrowest points of the passages, where they can bring to bear their force to the best advantage, are to be at such distances from one another as to keep the entire length and width of the channels under fire, leaving no dead space at any point for the enemy to rally.

With regard to the preceding, an enemy, before able to attack the forts in the main entrance, in forcing his way through the north or south channel, will have to pass the fire of seven forts, Round Island fort with its outlying works, always acting in conjunction with the

to be silenced before an attack on one of the forts in the main entrance can be attempted.

According to the outline given, there would be eight forts of the first order and six forts of the second order, altogether fourteen forts, the aggregate cost of which, at an average rate of half a million dollars for each fort, would amount to seven million dollars—a paltry sum of money in comparison to the interests at stake, and the advantages derivable.

Lake Michigan being protected by impregnable fortifications, it is only a question of time to build at Chicago and some other Lake Michigan ports, warships taking the offensive and coming to the rescue of the other Great Lakes.

The duty of self preservation and of upholding national independence dictates the closing of Lake Michigan against foreign invasion. Chicago gone, the country is gone.

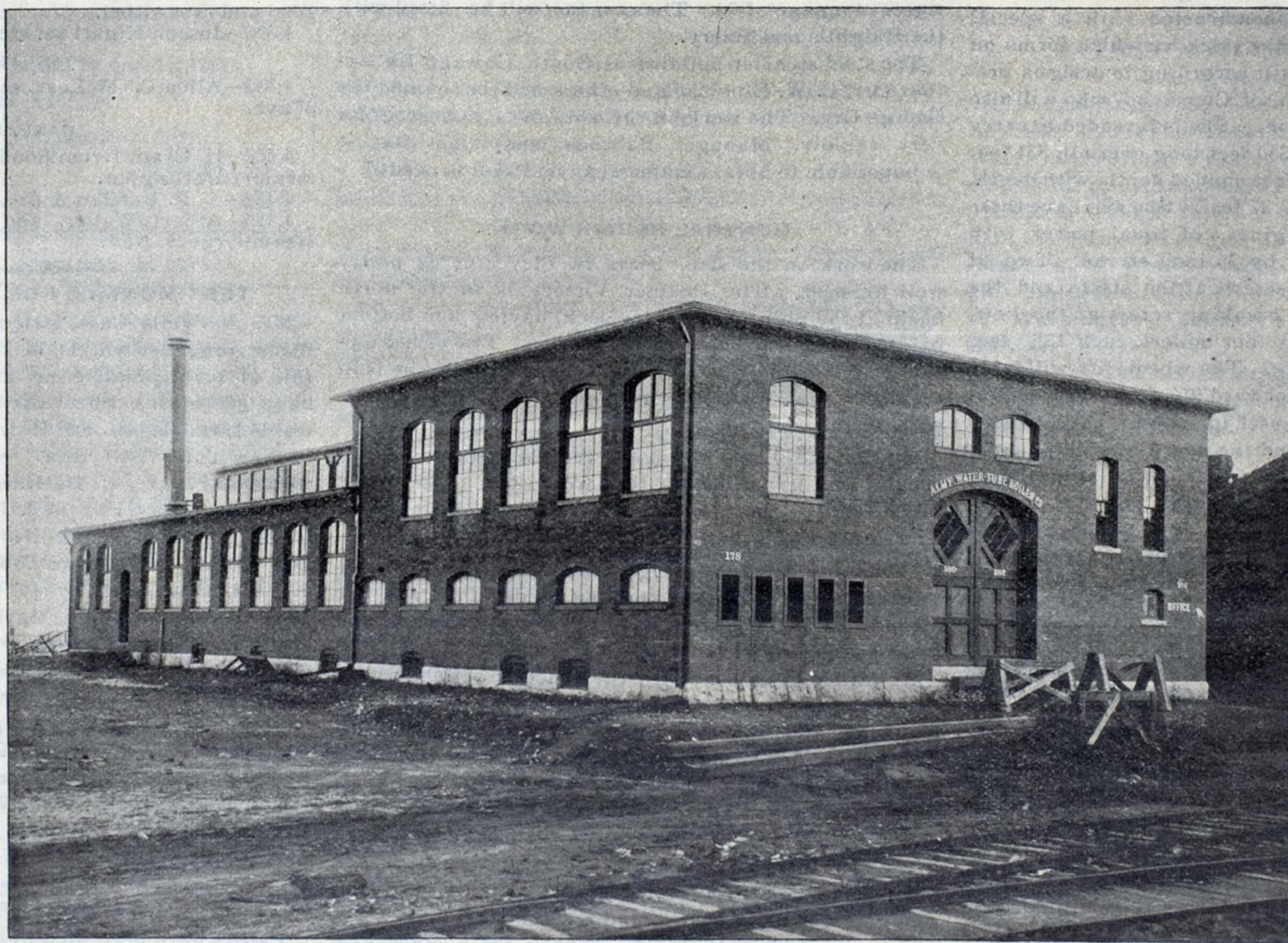
JOHN MAURICE.

Chicago, December 27, 1895.

## THE JANUARY CENTURY.

The Century for January, following upon two special numbers—the twenty-fifth anniversary and the Christ-

mas numbers—is not lacking either in individuality or in distinction. The capable and picturesque artistic work of Mr. Castaigne would of itself give distinction to any number of a magazine. For this month his pencil is applied to the illustration of the first of several separate papers on Rome by Mr. F. Marion Crawford, who first gives us "A Kaleidoscope of Rome," setting forth contrasts of the "Eternal City," with, so to speak, a reconstruction of the city as it was in the time of the emperors, and coming down to the Rome of the present day, which he describes with very distinct detail. Mr. Castaigne shows his versatility in the reconstruction of the Colosseum and the Forum in the days of the Christian martyrs, together with numerous scene and character sketches of today. Another novel



I.—NEW PLANT OF ALMY WATER TUBE BOILER CO., PROVIDENCE, R. I.

inner forts in the north or south channel. In forcing his way through the middle channel at Mackinaw, the enemy will be under the fire of Round Island fort and its dependencies, altogether three forts, and as he proceeds encounter in addition the fire from the two inner forts of the north channel. Its Round Island fort and its dependencies will always be engaged, no matter from where the attack is coming, and as this fort takes the enemy in the rear when assailing the forts of the main entrance, it is somewhat the key to the position, and therefore has to be exceptionally strong. But even this fort silenced, an attack by way of the middle channel prevents the enemy from displaying his full force at once against the forts in the main entrance, on account of the narrowness of the middle passage; and he being always kept under flank fire from the two inner forts of the north channel, there is certain destruction for him in every position in front of the main forts. Therefore, if all the forts in the north channel, together with Round Island fort and its flank works, have not been silenced, attacking the main forts by way of the north and middle channel is impossible.

Similar obstacles are found by the enemy forcing his way through the south channel; always seven forts have

article is an account by Borchgrevink, the explorer, of "The First Landing on the Antarctic Continent,"—the recent voyage of the whaler Antarctic. It will be remembered that Mr. Borchgrevink was the first person to make the landing, and that his appearance in the International Geographical Congress in London made a sensation in its proceedings. He has not before written anywhere an account of this voyage, and the Century paper is accompanied by pictures by himself, which have the advantage of being pioneers in this field. The article has as a preface a short account by General Greely entitled "Borchgrevink and Antarctic Exploration." In an article entitled "A Feast-Day on the Rhone," Mr. T. A. Janvier makes record of a trip, in which he was a participant, made by literary societies of Paris in the dedication of certain monuments. Mr. Janvier's pen and the pencil of Mr. Louis Loeb, together with a graphic account of this unique holiday, in which the scenery of the region is blended with the liveliness of a Bohemian picnic. Miss Alice C. Fletcher contributes another paper in her series of "Personal Studies of Indian Life," occupied this month with the "Tribal Life among the Omahas." These articles have won attention by the uniqueness of their ethnological value.



## ENGINEER SYMONS' OPINION.

Capt. Thomas W. Symons, Engineer Corps, U. S. A., who succeeded Major Ruffner at Buffalo, is very much in favor of damming Lake Erie at the head of Niagara river, with a view to regulating the level of the lakes. He recently gave his views in an interview as follows:

"I am very glad to see the question of regulating the level of water in the Great Lakes receiving the attention of Congress.

"This matter must come up for decision and action sooner or later. The reduction of level due to various causes in the lake harbors produces great inconvenience and is in reality an enormous tax on commerce. The main cause of the present low water in the lakes is undoubtedly the general lack of water due to the dry seasons which we have been passing through. But added to this is the fact that we have been excavating channels and expediting the flow of water out of the lakes. This cannot go on forever without producing a general diminution of lake levels.

"Added to all this is the prospect of the abstraction of a large volume of water at Chicago. This adds to the magnitude of the problem and the necessity for controlling the lake levels.

"Right here in Buffalo and in Lake Erie, where we are all more particularly interested, the water is nearly three feet below mean lake level and will go lower.

"The natural remedy to keep the water at full depth is to emulate the example of the beaver and build a dam at the outlet of the lake. If Lake Erie were a small lake entirely within the control of the United States there would probably be no question of the propriety of building at its outlet a dam with regulating works to guard against excessive floods and hold back the water during low water periods, and with provisions for the passage of vessels into and from the waters below. The fact that it is a large lake with many and important harbors, and that it is controlled by two nationalities does not change the general condition of the problem; it only complicates and magnifies it.

"The interests of the two countries run in such parallel lines that it would seem reasonable to expect that a mutually satisfactory agreement could be reached. The Welland canal is now seriously incommoded by lack of water. It is easy to see how advantageous it would be to it were Lake Erie kept up to mean lake level or higher.

"It is quite possible to conceive of a dam being built across the Niagara River near its head which would so control the waters of Lake Erie that they would never fall below a specified plane, say that of mean lake level, or nearly three feet above the present level at Buffalo. A portion of this dam could be movable, so that the section of discharge could be enlarged during periods of high water, and thus prevent excessive rises in the lake. In connection therewith a dock would be essential for the down river commerce.

"Of course there would be an enormous number and variety of interests concerned in the results of such a structure. To harmonize them all would be a work of

great magnitude, and perhaps an impossibility. Probably some few would have to suffer a little for the great benefit of the many.

"The alternative of this will be the expenditure of vast amounts of money in the lake harbors, trying to keep the bottoms far enough below the lowered lake surface for the accommodation of the vessels engaged in commerce. This alternative would still leave the fluctuations in the lake levels to annoy and inconvenience commerce.

"I do not speak as a settled advocate of any particular plan. This plan for regulating the lake levels is mentioned as a reasonable possibility of the future. As an engineering proposition I believe it to be feasible and entirely practicable, and that it would be found a most satisfactory remedy for the ills of low water besetting commerce in Lake Erie and its harbors."

## TRADE NOTES.

Philip Braender, of No. 283 West 118th Street, New York, has been notified by Superintending Engineer Walfred Sylven, of the Lighthouse Service, announcing that the Lighthouse Board has decided to fit Lightship

## IN ITS NEW HOME.

(SEE ILLUSTRATIONS.)

The Almy Water Tube Boiler Co., of Providence, R. I., was formed in September, 1889, Mr. Darwin Almy being the prime mover, and was incorporated the following year, making that gentleman president and treasurer, D. D. Spence vice-president and secretary, and F. D. Almy superintendent. The company was formed expressly for the manufacture of a water tube boiler especially adapted for marine work. Six years ago this month they placed their first boiler in the steamer Queen City, of Providence, and their sales have increased so rapidly and steadily that the company have been obliged to erect a fine new plant for the construction of these boilers. An illustration of the newly finished building and one of the fully equipped interior are herewith presented. The building is 150 feet long by 60 feet in width, and is two stories high in front, furnishing commodious offices on the second floor, while the monitor roof in the rear affords ample light and space for the traveling cranes to work. There are two of these five-ton traveling cranes that run over tracks the entire length of the building of 25 feet span. The

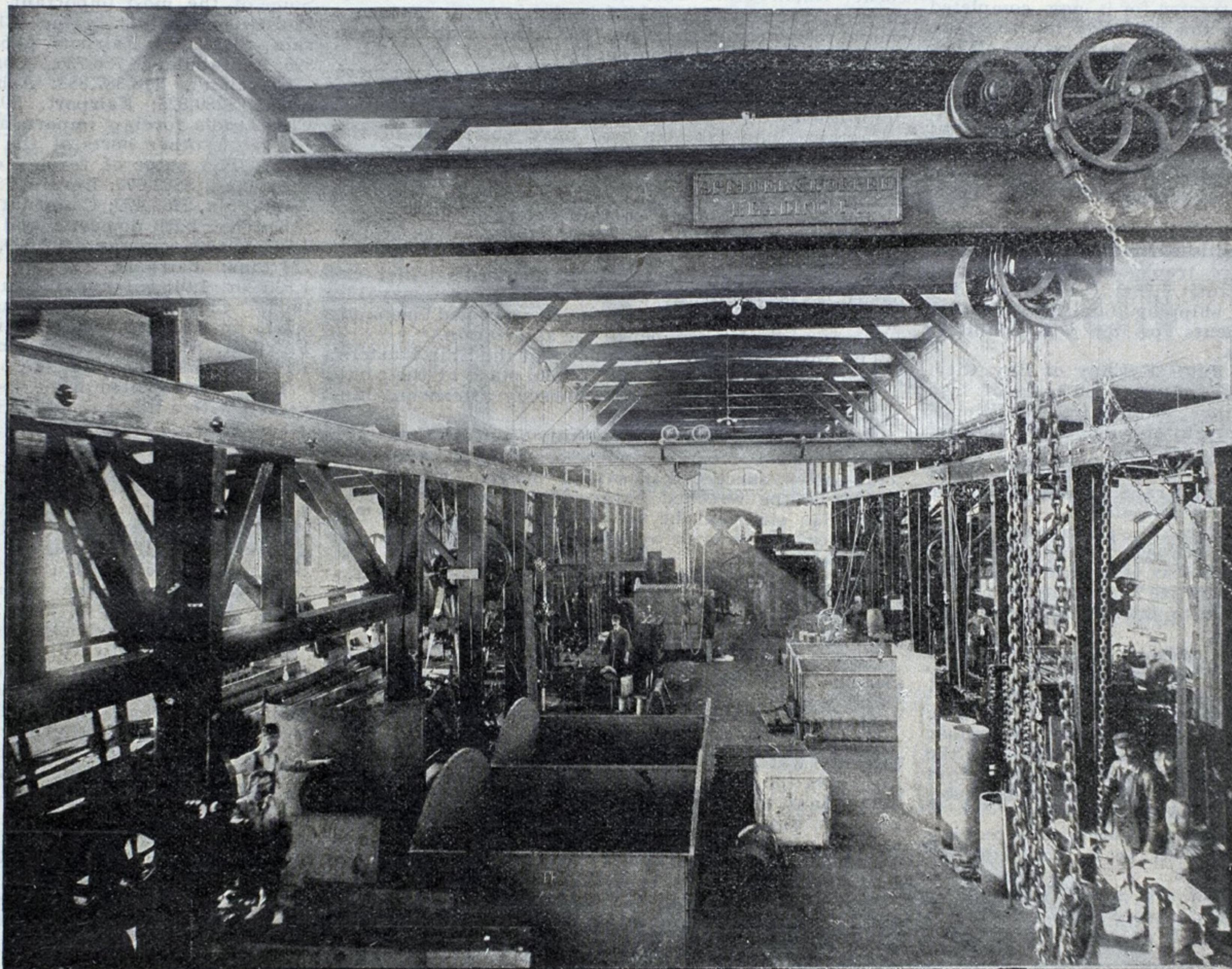
machine shop is well equipped with all the modern machinery for turning out the best of work in this line in the most economical manner. They are equipped with a boiler of the Almy manufacture, and an engine designed to carry 200 pounds of steam and built by James H. Paine & Sons, of Boston, which also furnishes power for their electric light plant.

The Almy company have received orders for their boilers from all parts of the United States, and from England, Canada, Mexico and other foreign countries. Among the boilers of this make which have been placed on some fine steam yachts are those on the Ballymena, owned by John Nicholson Brown, of Providence; Admiral, owned by Richard W. Comstock, of Providence; the Formosa, Geo. Fabyan, Boston; Oneida, F. C.

Benedict, of New York; the Aida, L. H. Tillinghast, of Providence; the Alcedo, George Drexel, Philadelphia; the Varuna, K. H. White, Boston; the Free Lance, F. A. Schermerhorn, of New York. These boilers range from 200 to 1,000 horse-power. The fire-boat Cleveland, owned by the City of Cleveland, is supplied with these boilers, and the government torpedo boat Stiletto contains one which has done excellent service for the past four years. Some 25 passenger boats are supplied with these boilers, all of which have given good satisfaction.

PAST Assistant Engineer John R. Edwards, of the Navy, whose lectures on the Navy created such a sensation last summer, has been promoted to the rank of Chief Engineer.

SENATOR HALE has introduced a bill providing for the construction of 25 torpedo boats at a cost of \$175,000 each, and of six sea-going coast line battleships designed to carry the heaviest armor and most powerful ordnance afloat, on 11,000 tons displacement, and to cost, exclusive of armament, \$4,000,000 each.



2.—INTERIOR OF PLANT OF ALMY WATER TUBE BOILER CO.

No. 67 with a Braender Automatic Bilge Syphon. Mr. Braender issues a pamphlet giving full information about its use.

The Continental Iron Works, of Brooklyn, N. Y., have just issued a handsome catalogue, in board covers, describing the Morison Suspension Furnaces and internal furnace tubular boilers for stationery service, and also their corrugated furnaces.

The General Nerino is to be the name of the new steel sidewheel gunboat being built at the yard of Hugh Ramsay, Perth Amboy, for the Colombian government. She is to be equipped with a Roberts safety water-tube boiler and will have 15 knots speed on a maximum draft of 3½ feet.

The new Hydrographic Office Chart of Lakes Erie and Ontario, is something no master sailing the lower lakes can afford to be without. It contains the latest information regarding depths of water, compass variation, lights and fog signals, and includes Lake St. Clair and St. Clair and Detroit Rivers, besides the lower end of Lake Huron, the southern part of Georgian Bay and all of Saginaw Bay. These charts can be obtained at the office of THE MARINE RECORD, No. 144 Superior street, Cleveland, at 75 cents each.



## NEWS AROUND THE LAKES.

## DULUTH AND SUPERIOR.

*Special Correspondence to The Marine Record.*

The preparatory work is progressing toward the construction of the extension of the Duluth & Winnipeg dock, and the pile drivers are already on the ground. As soon as the ice is thick enough to support them the piles will be driven. The piles are on the ground and the work of sharpening them will begin next week. Mr. Peppard of Minneapolis has the contract. The extension will be 900 feet long, and will hold 150 pockets of ore. The dock is now about 700 feet in length, with 100 pockets. The extension will cost about \$200,000, 4,000,000 feet of lumber and 500 tons of iron being used in its construction.

In about two months the Omaha Railway Company will commence hauling Minneapolis flour to its immense merchandise dock at Allouez Bay. The big warehouse, which occupies three-fourths of the dock, is about completed and it is the intention to have it filled with flour from the Minneapolis mills so that it can be shipped down the lake immediately after opening of navigation.

It is hardly probably that the Omaha company will do any further work in connection with the construction of the dock this year, as was at first expected. The portion of the dock which was contracted for is now completed and it is thought will meet the demands for the first three months after the opening of navigation. Work will be commenced, however, on another portion of the dock which will be completed in time for the fall business which is always much heavier than in the spring. The grading and approaches necessary have been put in and it will be no great job to complete the other portion of the dock, as the only work in connection will be a little dredging and driving of the piles and the superstructure.

The flour to be handled over the new Omaha dock will be from Minneapolis and will be chiefly carried by contract with one of the large transportation companies probably the Western Transit Line. The local mills will thus be given better shipping facilities at other docks, and the flour shipments for 1895 will doubtless show an immense increase.

Selwyn, Charles F. and John F. Eddy of Bay City, have completed the purchase of about 360 acres of iron lands in 57-21 from the Luther Mining Co., of Illinois, for \$100,000, subject to the right of way of the Duluth, Mississippi River & Northern railroad.

Holland Montgomery & Graves, of Buffalo, have bought 879,000 feet of extra grade lumber from the Merrill & Ring Co., for spring shipment.

Lumber shippers estimate that the amount of lumber which will be on dock in Duluth and Chequamegon Bay at the opening of navigation next year will not exceed 225,000,000 feet. All shippers are indulging in a good deal of bear talk in reference to lake freights for next season.

The Duluth & Iron Range railroad company has let a contract for the erection of another iron ore shipping dock at Two Harbors. This will be the fifth dock built by the company for the shipment of iron ore. It will be 1,600 feet in length, and over 6,000,000 feet of lumber will be used in its construction. The addition of the dock to the already existing facilities for shipping iron ore will make Two Harbors the largest ore shipping port on the lakes, and that means in the world.

The Philadelphia & Reading contemplates extending its Superior dock 250 feet next year, increasing its storage capacity to 200,000 tons.

The St. Louis & Western will probably extend its dock on Conner's Point next season, so as to increase the capacity to 300,000 tons.

## PORT HURON.

*Special Correspondence to The Marine Record.*

Capt. Geo. R. Bennett and others have purchased from Runnels & Sinclair the steambarge Cleveland for \$6,500 cash. She will continue in the lumber trade, towing barges Schilde, Magnet and one other. Capt. Bennett, who was three years on the Magnet and three on the schooner Savidge, will command her.

Thompsons will build a new tug for the tug Ingeram's machinery.

The old steambarge Mineral Rock will be converted into a tow barge this winter.

The tug Lormer arrived up Friday from Detroit with schooner Lamb and barge Golden Rule, both laden with coal.

The White Star left here with her tow of barges en route to Detroit, where their cargoes of lumber are consigned.

The Russell Wrecking Co. have had to give up the work of raising the Itasca on account of the weather. Their compressor would not pump the amount of pressure they wanted, and there was some ice running that made it dangerous for a diver to work. They will resume work as soon as spring opens. All the coal was not pumped out. That will be all taken out in the spring, and she will be raised without any trouble.

The tug Kittie Haight was in the lower dry-dock to have her machinery removed.

The tug Protector arrived here with the steamer St. Joe and barge Oneonto in tow. She got them out of the ice in Saginaw Bay and brought them here. The St. Joe is in the Wolverine dry-dock. She was badly

cut up by the ice. They are partly loaded with coal, but it will prove a very losing trip for them. The tug Protector left Saturday morning to go to the assistance of the Jim Sheriff, astern in Lake Michigan.

The tug J. P. Clark is laid up here. She has been at work on the deep channel contract at Bar Point for two years, and will assume work there next spring.

KENDALL.

## CHICAGO.

*Special Correspondence to The Marine Record.*

The Marine Engineers' Beneficial Association No. 4, Chicago, at a meeting held at their hall, corner of Randolph and Clinton streets, Friday evening, December 27th, elected the following officers for the year 1896: John Reif, president; Chas. Van Avery, vice president; D. W. Wise, financial secretary; Geo. Grubb, corresponding secretary; E. E. Morris, recording secretary; John Williams, chaplain; James Groves, conductor; John F. Conley, doorkeeper; James Donley, treasurer; T. F. Dowd, John Murdock and John Reif, trustees. T. F. Dowd and George Grubb were chosen as delegates to represent Chicago No. 4 Lodge at the 22d Annual National Convention of the M. E. B. Association, to be held at Washington, D. C., about January 20.

The M. E. B. A. No. 4, Chicago, will give their twenty-first anniversary reception and ball at Brand's Hall, corner North Clark and Erie streets, on Wednesday evening, January 29th. All friends of marine engineers should rally around them on that occasion and help to make it an enjoyable evening.

Captains F. C. Hart and Marion Tenney are here looking after the repairs being done on the steamer John Emory Owen and consort Michigan in dock.

Captain John Isbester will have command of the steamer Josephene next season. Captain John Massey, formerly of the Josephene, will command the steamer Arthur Orr.

Captain A. C. Johnson, captain's clerk of the Masters' and Pilots' Association, last week handed to the widow of Captain John Ferguson, who lost his life on the tug O. B. Green, when the tug T. T. Moeford's boiler exploded, a check for the amount of insurance payable upon the decease of her late much-respected husband, who was a charter member of the association.

The installation of the officers of the Ship Masters' Association, Chicago No. 3, will take place at their hall at the LeGrande Hotel, on Wednesday afternoon, January 8.

The Dunham Towing & Wrecking Co., with their tugs Mosher and Perfection and a centrifugal pump and some scows, succeeded in saving nearly 1,000 tons of coal from the wrecked barge Nicholson, last week. They also stripped the vessel of all her gear. The Nicholson's stern is in very bad shape, otherwise she could be released.

The tugs Perfection and G. W. Gardener towed the steamer Mariska down the river and to South Chicago Tuesday afternoon. The Mariska will go into the Chicago Shipbuilding Company's dry dock.

Capt. James R. Parker, who was chief mate on the steamer, John Harper last season, is now acting as ship-keeper on her this winter.

The Dunham Towing & Wrecking Co. have three of their tugs in the employ of the city, engaged in looking after the waterworks cribs, and the new tunnels building under the lake, and to furnish them with supplies. The company have taken into their employ Adam Kiyoshk, the big Indian marine diver, formerly of the wrecking tug Favorite.

Cullerton & McRae, owners of the tug Sill, have contracted with the Illinois Central R. R. Co. to do the winter work of keeping the ice broken up around the work of pile driving in the inner harbor, to form the outside portion of the new Lake Front Park.

The many friends of Capt. Miles Barry of the Independent Tug Line, will be pleased to know that he is around again at his office after undergoing a painful surgical operation to a broken cartilage in his knee, which necessitated his staying home for about two weeks.

WILLIAMS.

## BUFFALO.

*Special Correspondence to The Marine Record.*

The ferry line which Capt. E. C. Maytham and others, contemplated starting between Black Rock and Victoria, Ont., as announced last week, is now a certainty. They have bought the old Detroit river ferry steamer Hope, and will have her rebuilt at Walkerville. She will go on this route in the spring.

Bids were opened by the Board of Public Works last Friday for the construction of abutments, piers and approaches for the new lift bridge over Buffalo river at Michigan street. Delaney & Mullen bid \$48,000 for the work; the Buffalo Dredging Company, \$54,000; Hingston & Woods, \$64,980; and Dwyer & Huntington, \$51,494.

Lumber receipts for the Tonawanda ports in season of 1895 aggregate 421,373,000 feet against 406,538,000 feet last season. This still leaves the past two seasons considerably below previous totals, as in 1892, 489,005,000 feet; 1891, 505,512,000 feet; 1890, 718,650,000 feet. It is believed that the upturn is now made on account of a real increase in handling and that the recovery will be rapid from now on. Tonawanda is becoming known more and more as a sales port, and as the forwarding falls off the actual sales will more than make up the loss. Receipts of shingles for the past season were 41,300,000, being more than 25 per cent above last year.

## CLEVELAND.

Chaplain Jones gave the usual holiday entertainment at the Floating Bethel Saturday afternoon to the children of the Sunday School of the Floating Bethel and the Hamilton street mission. One hundred children were made happy with as many neat little baskets containing liberal supplies of candy, raisins and nuts, besides more substantial gifts in the line of mittens and stockings. Chaplain Jones does a fine work among the people of his district, and indeed all over the city. His bills for coal, sent to poor widows and houses where sickness makes inroads on the family pocketbook, are very heavy. The Chaplain always personally investigates cases before giving relief, and has had too much experience in his 28 years of mission work to be imposed upon. Funds sent to the Chaplain at the Floating Bethel, on River street, to Capt. Thomas Wilson, Perry-Payne Building, or to J. W. Walton, of the Upson-Walton Co., will find their way to the Floating Bethel work.

Capt. John Mitchell, Capt. Alfred Mitchell, Capt. S. Stratton, H. S. Hills, John F. Wedow, and Philip Morris, of Cleveland, and Capt. J. H. H. Brown, of Buffalo, have organized the Etna Steamship Co., with a capital stock of \$200,000, to operate a steel steamer building at F. W. Wheeler & Co.'s yard, West Bay City.

Capt. George A. McKay, marine clerk of the Cuyahoga customs district, gave to the press Wednesday his annual report of the lake commerce of the district. Some of the most important features are as follows: Coastwise receipts, value—Cleveland, \$24,649,434; Lorain, \$1,245,259; Fairport, \$4,558,044; Conneaut, \$1,037,896; Ashtabula, \$8,756,736. Coastwise shipments, value—Cleveland, \$18,387,883; Ashtabula, \$2,225,024; Conneaut, \$250,825; Fairport, \$938,239; Lorain, \$810,625. Cleveland's foreign imports amounted to about \$1,000,000, but at other ports of the district were inconsiderable. The value of foreign exports was as follows: Cleveland, \$862,890; Lorain, \$34,540; Fairport, nothing; Ashtabula, \$263,479; Conneaut, \$273,197.

Entries, both domestic and foreign, Cleveland, were 3,763, with a tonnage of 2,829,362; Lorain, 383, or 193,724 tons; Fairport, 580, or 701,793 tons; Ashtabula, 1,536 or 1,918,861 tons; Conneaut, 205, or 486,382 tons. Clearances were as follows: Cleveland, 3,711, or 2,820,165 tons; Lorain, 381, or 188,262 tons; Fairport, 568, or 705,615 tons; Ashtabula, 1,627, or 1,192,402 tons; Conneaut, 407, or 484,174 tons.

There are enrolled in the district for the year 1895, 286 vessels with a tonnage of 258,843.67 tons, compared with 278 vessels, of 241,693.81 tons in 1894. There were 15 vessels of 17,768.15 tons gross, added to the enrolled tonnage of the district during 1895. Two vessels of 6,828.33 tons gross, were built in the district but enrolled elsewhere. Nineteen vessels, formerly enrolled elsewhere, were transferred by sale to the Cleveland district during 1895, having a total tonnage of 11,882.61. Seventeen vessels, with a total tonnage of 9,463.92 were reported lost by wreck from this district during the year. Nine vessels, of 3,066.29 tons were transferred by sale from the Cuyahoga to other districts during 1895.

Dr. R. M. Woodward, past assistant surgeon, U. S. Marine Hospital at Cleveland, reports as follows for the fiscal year ending June 30, 1895: hospital patients, 297; outside patients, 1,082; relief furnished outside patients, 1,528 times; relief furnished hospital patients, 9,074 days. Twelve patients died.

Capt. Orville Green, of the steamer Griffin, has gone with Mrs. Green to California, where they will spend the winter.

## FLOTSAM AND JETSAM.

The Canadian government will sell the confiscated fishing tug Telephone at Malden, January 8.

Capt. D. P. Wright, of Geneva, formerly in the P. P. Pratt, has accepted the command of steamer Alex Nimick.

The Johnson Company are arranging for the construction of the ore hoists at their furnace docks on Black River.

Capt. John McNeff, who has sailed the Germanic for a number of years, will be on the City of Glasgow next season.

The Canadian and United States Deep Waterway Commissioners are arranging by correspondence the date of their first meeting.

The common council of Green Bay have accepted the plans of City Engineer Shaw, of Marinette for a new iron drawbridge. It will be built over East River and will cost \$10,000.

Harris F. Dunbar, of Sault Ste. Marie, Mich., has purchased the interest of his father, C. F. Dunbar, of Buffalo, in the dredging plant, shipbuilding yard, and repair shops of Dunbar & Sullivan, at the Sault.

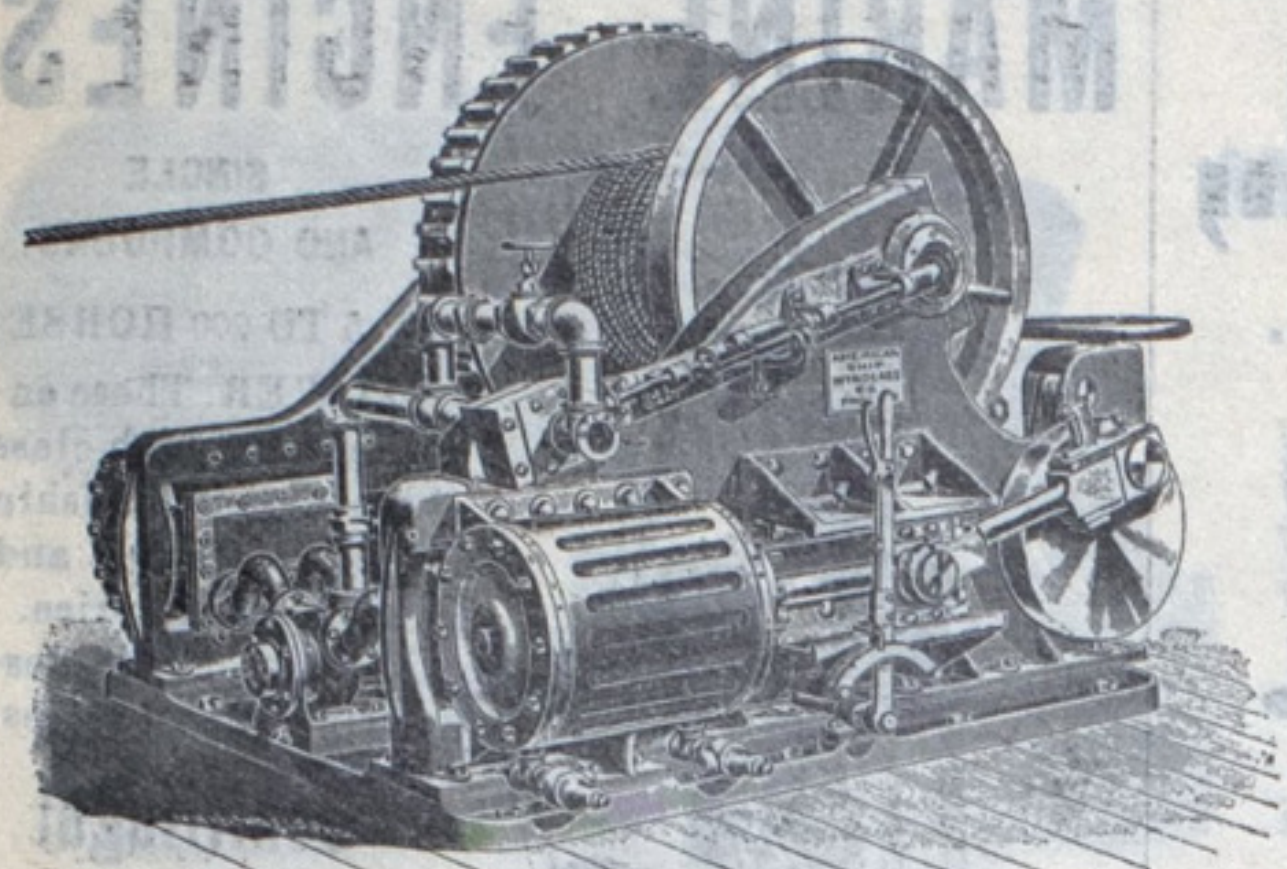
The life-saving stations at Bailey's Harbor and on Plum Island have been completed and turned over to the government. No keepers have yet been appointed.

The currents of the St. Joseph river having changed during the late floods, a bar has formed near the mouth of Benton Harbor ship canal which blocks navigation for boats drawing more than ten feet.

Senator McMillan has prepared for early introduction a bill appropriating \$200,000 for a new revenue cutter to take the place of the Fessenden, and designed so as to be quickly convertible into a gunboat.

Toledo Lodge of the M. E. B. A., elected officers as follows: President, George Reynolds; vice-president, George Curtis; corresponding and financial secretary, E. Locke; recording secretary, John Marshall; treasurer, F. W. Weis.





Hoisting, Mining, Bridge Erecting,

Dock Build'g, Pile Driving, Coal Hoisting and Quarry Engines

of any power, sugar cane transferring engines, transferring machines for depositing cane from car to carrier, with my improved Patent Friction Drums, with or without Boilers. Any amount of reference given. Established 1870.

Send for Catalogue. J. S. MUNDY, Newark, N. J.  
1741 Market St., Philadelphia, Pa.  
22 Light St., Baltimore, Md.  
117 Water St., Pittsburgh, Pa.  
249 South Jefferson St., Chicago, Ill.  
715 North Second St., St. Louis, Mo.  
39 Magazine St., New Orleans, La.  
34 Fremont St., San Francisco, Cal.  
85 Front St., Portland, Oregon.  
Fourth & Wakouta Sts., St. Paul, Minn.  
218 Congress St., Boston, Mass.

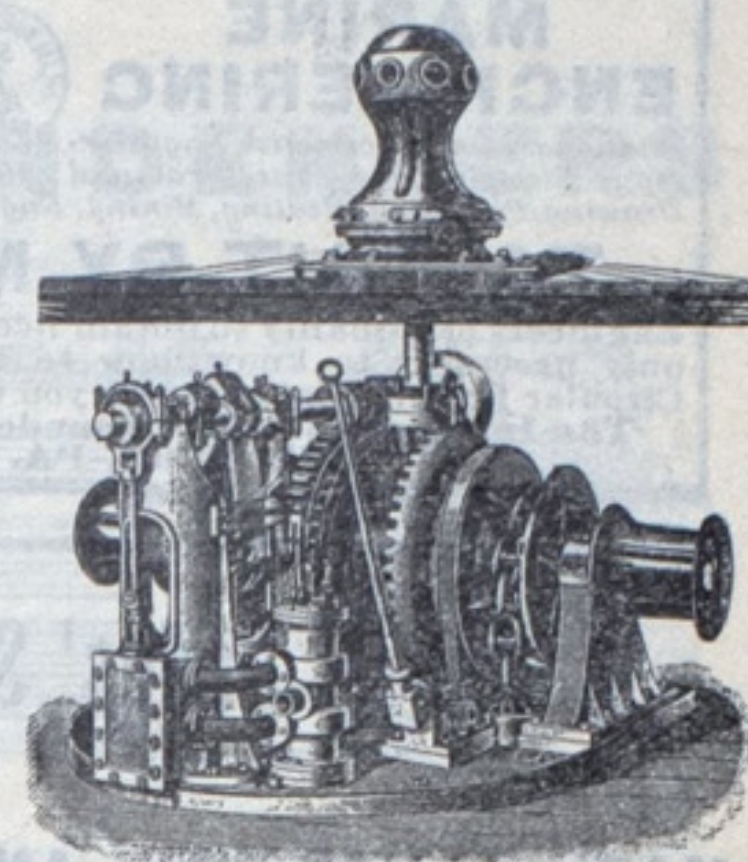
ESTABLISHED 1857.

AMERICAN SHIP WINDLASS CO.,

PROVIDENCE, R. I.

MORE THAN SEVEN-EIGHTHS OF THE STEAMSHIPS  
OF THIS COUNTRY HAVE THE PROVIDENCE  
WINDLASS AND CAPSTANS.

ADDRESS FRANK S. MANTON, AGENT.



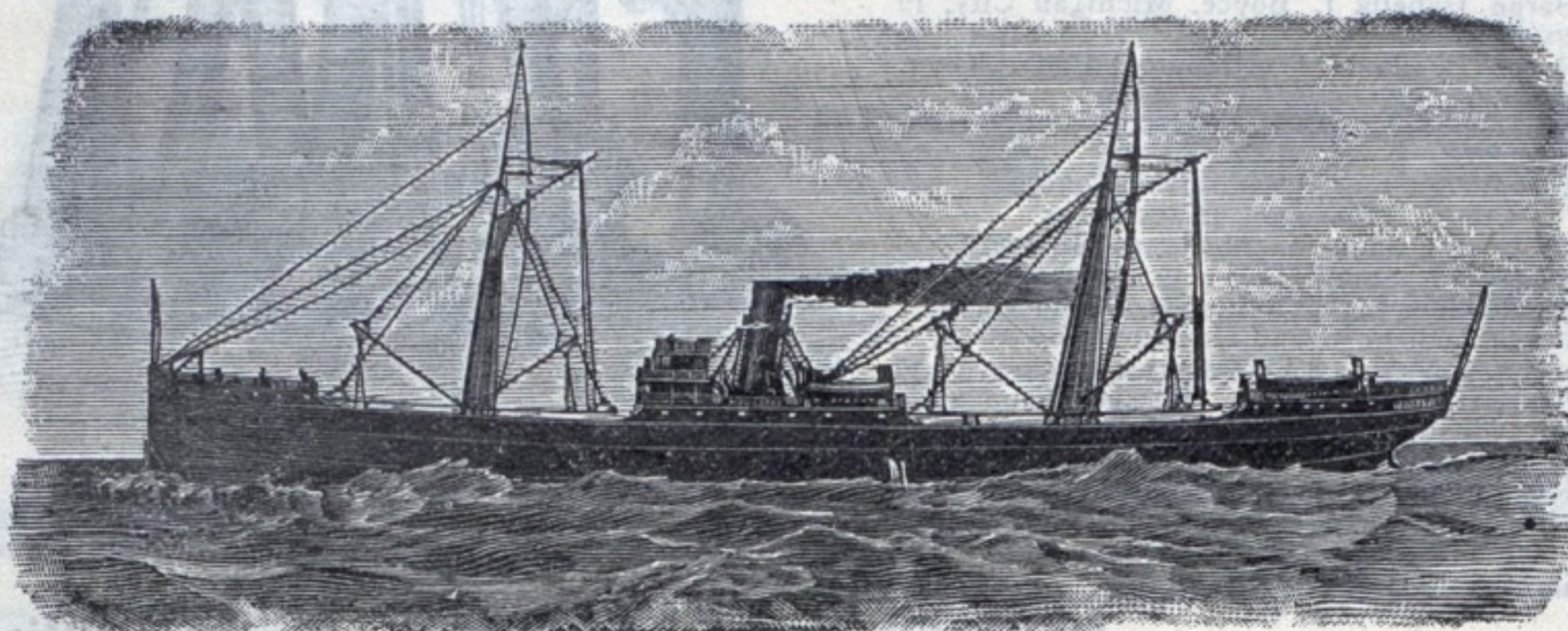
F. W. WHEELER & COMPANY.,

BUILDERS OF ALL KINDS OF

IRON, STEEL AND  
WOODEN SHIPS,

FOR LAKE OR OCEAN SERVICE.

West Bay City, Mich.



F. W. WHEELER, Prest. E. T. CARRINGTON, V.-Prest  
C. W. STIVER, Secretary & Treasurer.

FRONTIER IRON WORKS,  
MARINE ENGINES,  
DETROIT, MICH.

INCORPORATED 1794.

Insurance Company of North America.

CAPITAL, PAID UP IN CASH, - \$3,000,000.00.  
ASSETS, - 9,562,599.92.

CHARLES PLATT, President. WILLIAM A. PLATT, Vice President.  
EUGENE L. ELLISON, 2d Vice President. GREVILLE E. FRYER, Sec'y and Treas.  
JOHN H. ATWOOD, Assistant Secretary.

Lake Marine Department.

GEORGE L. MCCURDY, MANAGER,  
CHICAGO, ILL.

MARINE AND INLAND INSURANCE.

Atlantic Mutual Insurance Co.,

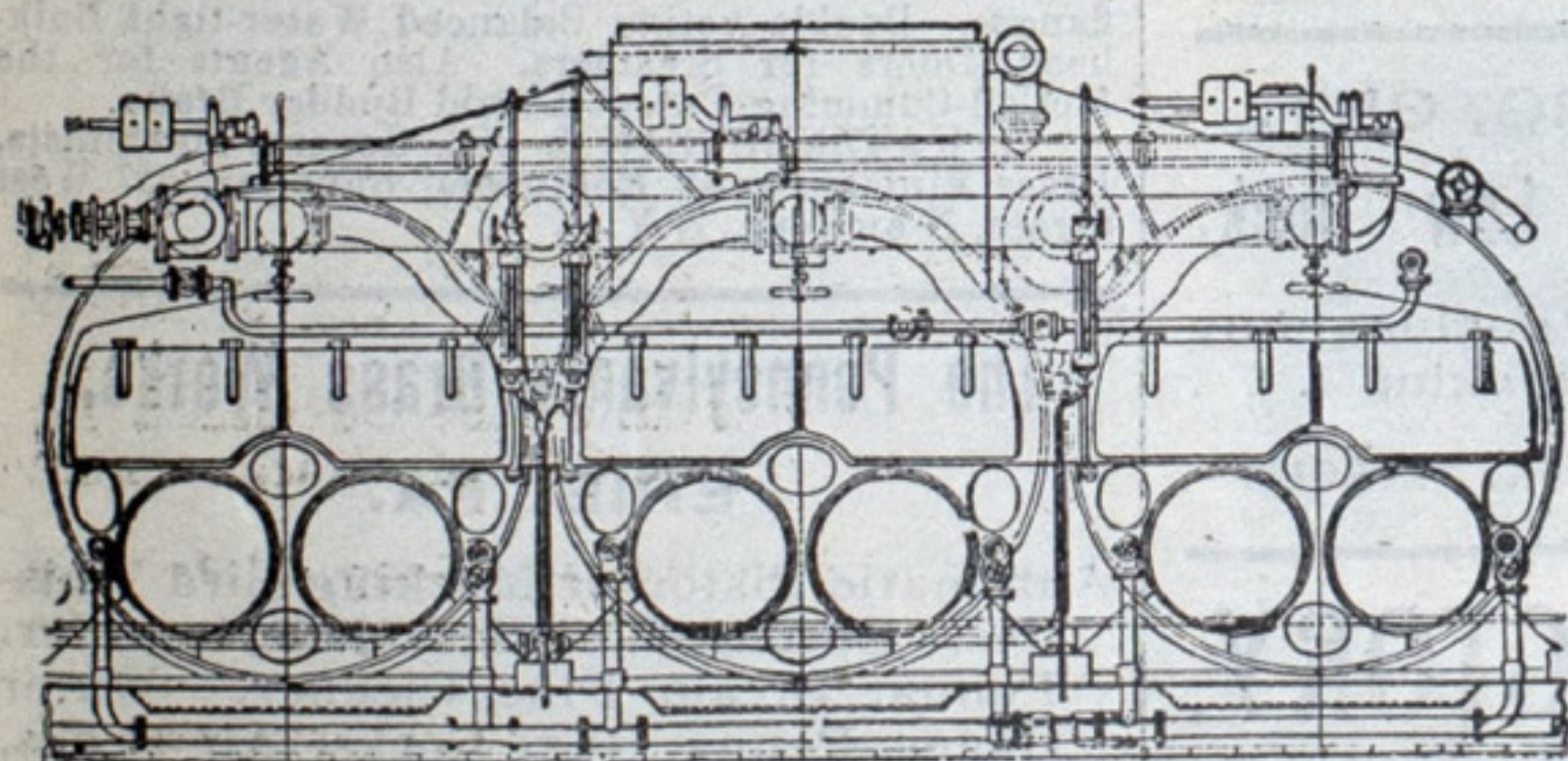
Organized 1842. Office 51 Wall Street, NEW YORK.

Insures against Marine and Inland Transportation Risks and Issues Policies making Loss Payable in England.

Assets over \$10,000,000 for the Security of its Policies.

The profits of the Company revert to the assured, and are divided annually upon the premiums terminated during the year; thereby reducing the cost of insurance. For such dividends, certificates are issued bearing interest until ordered to be redeemed, in accordance with the charter.  
J. D. JONES, Pres. W. H. H. MOORE, Vice Pres. A. A. RAVEN, 2d Vice Pres. J. H. CHAPMAN, Sec.

LAKE ERIE BOILER WORKS



The best equipped  
plant in America for  
the manufacture of

MODERN  
MARINE  
BOILERS.  
BUFFALO, N. Y.



Marine Iron Works,

Clybourn & Southport Aves.,  
CHICAGO.

BUILDERS OF  
STEAM YACHTS,  
MARINE ENGINES,  
MARINE BOILERS.

Write for List of Boats for Sale.

MODEL C.

THE CASE OUTWARD THRUST  
PROPELLER WHEELS.

MODEL A, MODEL B, MODEL C, MODEL D, MODEL E.

The Speediest, Smoothest Running  
and Most Economical Wheels Yet Made.

MANUFACTURED BY A. WELLS CASE, Patentee, Highland Park, Conn.

THE BERTRAM ENGINE WORKS CO., Toronto, Ont.

S. F. HODGE & CO., Detroit, Mich.

THE GLOBE IRON WORKS CO., Cleveland, O.

MODEL D.



**MARINE ENGINEERING**  
(Stationary and Locomotive Engineering, Electrical, Architectural and Mechanical Drawing, Plumbing, Heating, Mining, English Branches, etc.)  
**TAUGHT BY MAIL.**  
Engineers can qualify to obtain licenses. To enroll only necessary to know how to read and write. Circular free. State subject you wish to study. The International Correspondence Schools, SCRANTON, PA.

**Walter H. Oades' Shipyard,**

**MARINE RAILWAY AND SHEERS,**

**Ship Carpenters, Calkers & Joiners.**

Working on reasonable terms.

Yard: Foot of Dubois Street, DETROIT.

Telephone 1670, 3 rings.

ABRAM SMITH.

ANGUS H. SMITH.

**ABRAM SMITH & SON,**  
**SHIP-BUILDERS,**

ALGONAC, MICH.

Wooden Ships of any description built, rebuilt, or repaired.

Send for specifications, prices, etc.  
Good slips for laying up boats.

**A. J. MORSE & SON.**  
**DIVING APPARATUS**  
140  
**CONGRESS ST. BOSTON.**

**A. GILMORE & SONS**

**TOLEDO DRY DOCK.**

Telephone No. 157, TOLEDO, OHIO.

Vessels Docked and Repaired  
at Reasonable Rates.

PATENTS, CAVEATS, TRADE-MARKS, DESIGN PATENTS  
COPYRIGHTS, Etc.

CORRESPONDENCE SOLICITED.

John A. Saul, Atlantic Building,  
Washington, D. C.

**ROBERT E. HILLS,**  
**STEAM FITTING AND HEATING**

Wrought Iron Pipe and Fittings, Engineers' Supplies; General Jobbing  
Work Done Promptly.

Also Proprietor of North Side Iron Works.

57 & 59 North Wells St. CHICAGO, ILL.

California passengers should ask agents of the Nickel Plate Road for rates and connections before purchasing tickets elsewhere. 489-52

ESTABLISHED 1871.

INCORPORATED 1893.

# MONTAGUE IRON WORKS CO.,

MANUFACTURERS OF

**Marine and Stationary Engines**

AND BOILERS OF ALL KINDS.

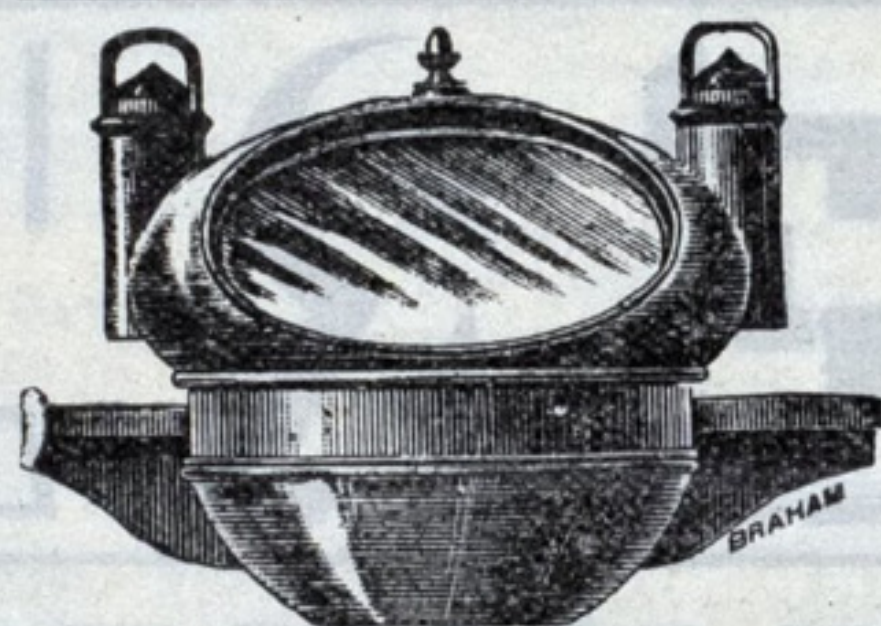
Heavy Castings a Specialty. Prices Quoted on Application.

Fore and Aft Compound Marine Engines.

The Engines in the following boats are of our manufacture.

Tug, Hunter, Chicago, 15 and 28x22.  
Tug, Tacoma, Chicago, 16 and 30x24.  
Tug, Zenith, Duluth, 18 and 36x30.  
Steamer Glenn, South Haven, 14 and 28x20.  
U. S. Survey Steamer, W. S. Hancock, 12 and 21x20.  
Steamer Pine Lake, Charlevoix, 16 and 30x24.  
Passenger Steamer Pilgrim, St. Clair, 14 and 28x20.  
Steam Barge Iona, Grand Haven, 24 and 46x42.  
Steam Barge M. T. Greene, Chicago, 20 and 36x36.  
Steamer H. W. Williams, South Haven, 18 and 36x30.  
Steam Barge Mark B. Covell, Manistee, 18 and 30x26.  
Steam Barge Isabella J. Boyce, Michigan City, 19 and 32x26.  
Steam Barge Luella H. Worthington, Cedar River, 19 and 36x30.  
Passenger Steamer City of Kalamazoo, South Haven, 20 and 40x30.  
Steamer Oval Agitator, Chicago, 14 and 28x20.  
Tug E. G. Crosby, Muskegon, 16 and 30x24.  
Tug Peter Coates, Sault Ste. Marie, 10 and 20x16.  
Steamer Lorain L. South Haven, 12 and 21x16.  
Passenger Steamer Lotus, Escanaba, 16 and 30x24.  
Steam Barge Sachem, Grand Haven, 21 and 38x36.  
Passenger Steamer Bon Ami, Saugatuck, 14 and 28x20.  
Steam Barge Charles A. Street, Chicago, 20 and 36x36.  
Steam Barge Edward Buckley, Manistee, 18 and 36x30.  
Passenger Steamer E. G. Maxwell, Pentwater, 14 and 28x20.  
Passenger and Freight Steamer Bon Voyage, Saugatuck, 16 and 30x26.  
Passenger and Freight Steamer Mabel Bradshaw, Muskegon, 16 and 28x26.  
The engraving represents our 20 and 36x36 Fore and Aft Compound Marine Engine. We build them all sizes and guarantee them to give satisfaction. Prices furnished on application.

**MONTAGUE IRON WORKS CO., Montague, Mich.**



**FRANK MORRISON, COMPASS ADJUSTER**

—AND MANUFACTURER OF—

**NAUTICAL INSTRUMENTS.**

COMPASSES, BAROMETERS, PATENT LOGS, BINNACLES, STEAM GAUGES, MARINE GLASSES, ENGINE INDICATORS.

All Nautical Instruments Carefully Repaired.

Office with Upson, Walton & Co., 161 River St., Cleveland, O.

**THE CUDDY-MULLEN COAL COMPANY**  
**DEALERS IN COAL.**

Docks at Government Pier, Whiskey Island, and Adjoining Globe Dry Dock.

All fully equipped with Revolving Derricks; also, Lighter Carrying Derrick, and One Hundred Two and One-Half Ton Buckets.

Main Office, 81 Perkins Building, East Side of Main Street Bridge.

Dock Office, 127 West River St., Cleveland, Ohio. Telephone No. 8.

Boats Coaled Day and Night.

Docks at Amherstburg and Sandwich, Ontario

**MULLEN-GATFIELD COAL Co.,**

Dealers in the Celebrated

**MANSFIELD AND YOUGHIOGHENY COALS.**

Docks at SANDWICH, ONTARIO, opposite the Fort at Detroit, with chutes for rapid fueling. Elevated docks and derrick at AMHERSTBURG, ONTARIO.

**O. W. SHIPMAN**  
**DOCKS.**

AMHERSTBURG, ONT.

Four Chutes and Low Dock.

Massillon and KOAL Youghiogheny Hocking

Main Office, 90 Griswold St., DETROIT.

**BEESON'S INLAND MARINE DIRECTORY.**

It is now in its tenth edition.

It is finely illustrated.

It circulates over the entire northwestern lake territory.

It comes from press annually about May 1st.

It is now the only purely Marine Directory published.

It drove out of competition, by sheer force of merit, its only directory competitor as early as 1891.

It was the only directory of any kind that was exhibited and sold at the World's Columbian Exposition.

It has grown annually in size, class of contents, number of subscribers and advertising patrons.

It is the most widely known and advertised publication of its class in this country.

It is ordered by and in use in all the offices of the United States Government having to do with vessel interests.

It contains new features annually, that insure renewal of nearly all old subscriptions.

It will pay you to advertise in it, or subscribe for a copy.

It contains the only list of steam and sail vessels ever published that is comprehensive of all classes and authentic enough to have received universal approval.

It is only necessary to address as below to get complete information relative to prices for advertising space or of the work.

HARVEY C. BEESON, Publisher, 308 Royal Insurance Building, CHICAGO, ILL.

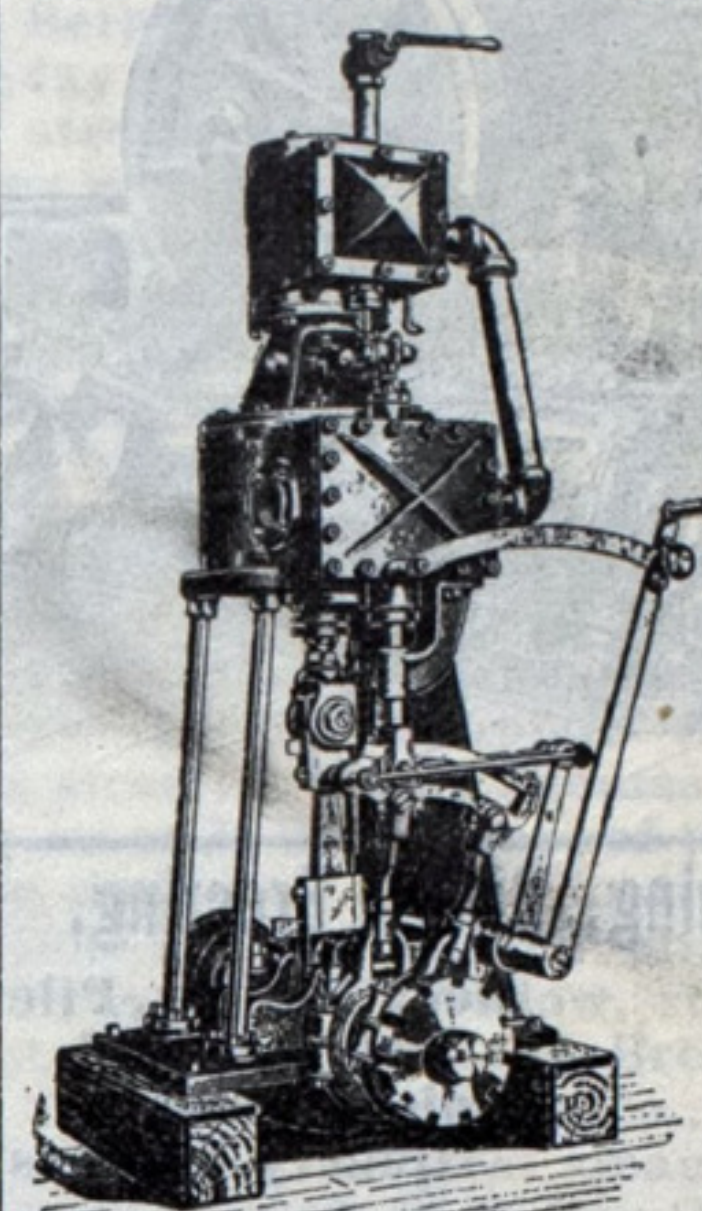
## MARINE ENGINES

SINGLE  
AND COMPOUND.

5 TO 200 HORSE-POWER. These engines are high-class in workmanship and material and moderate in price. Send for cuts, description and prices.

**Centrifugal  
Pumps**

For raising coal, sand, &c. For dredging, wrecking and circulating. Write for catalogue.



**MORRIS MACHINE WORKS,**

Baldwinsville, N. Y.

HENION & HUBBELL, Agents.

61-69 North Jefferson St., Chicago, Ill.

**Baker's Quadruple Grip Anchor**

PATENTED.

AGENTS WANTED.

**Watertown Brass & Mfg. Co.,**

WATERTOWN, N. Y.

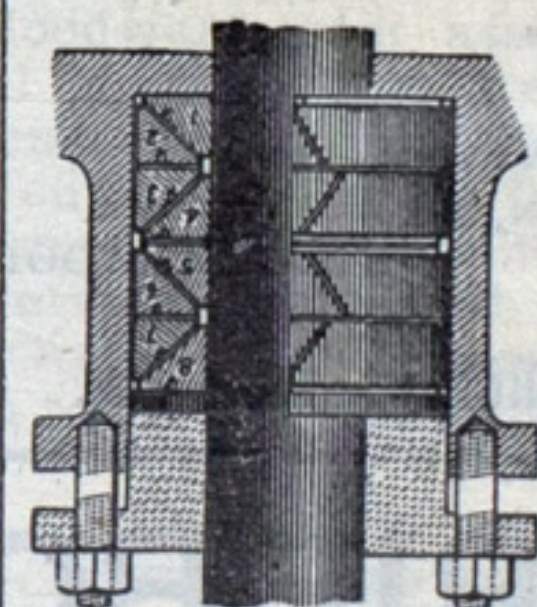
Send  
Stamp for  
Catalogue.



Mfrs. Yacht, Boat and Canoe Hardware.  
Special Work a Specialty.  
Boat Rails, Stanchions, Etc.

MENTION THIS PAPER.

**Katzenstein Self-Acting Metal Packing**



for Piston Rods, Valve Stems, Etc., of every description, for Steam Engines, Pumps, Etc. Adopted and in use by the principal Iron Works, Steamship Companies, Mills and Engine Builders, Electric Light and Power Plants within the last twelve years in this and foreign countries. Also FLEXIBLE TUBULAR METALLIC PACKING for Slip-Joints on Steam Pipes and for Hydraulic Pressure. Also

METAL GASKETS for all sizes and shapes of flanges. Double-Acting Balanced Water-tight Bulkhead Doors for Steamers. Also Agents for the McColl-Cumming Patent Liquid Rudder Brake.

L. KATZENSTEIN & CO., General Machinists, Brass Finishers and Engineers' Supplies, 357 West Street, New York, N.Y.

**The Pennsylvania Brass Works,**  
**ERIE, PA.**

Automatic Piston or Mocking Bird Whistles. Special Whistles made to order. Penna. Steam Flue Cleaner. Water Gages, Penna. Gage Cocks, Air Cocks, Oil Cups, Brass and Bronze Castings a Specialty.

**E. G. ASHLEY,**  
**CHOICE FAMILY GROCERIES.**

ALSO ALL KINDS OF

**Fresh, Salt and Smoked Meats.**

Vessel orders attended to day and night. Goods delivered by Steam Yacht "Maggie D."

36 & 38 Summit Street, TOLEDO, O

Now is the time to make your plans for your winter California trip. Ask agents of the Nickel Plate road about low rates and connections with the fast California trains out of Chicago. 488-52



# Wheeler Condenser & Engineering Co.,

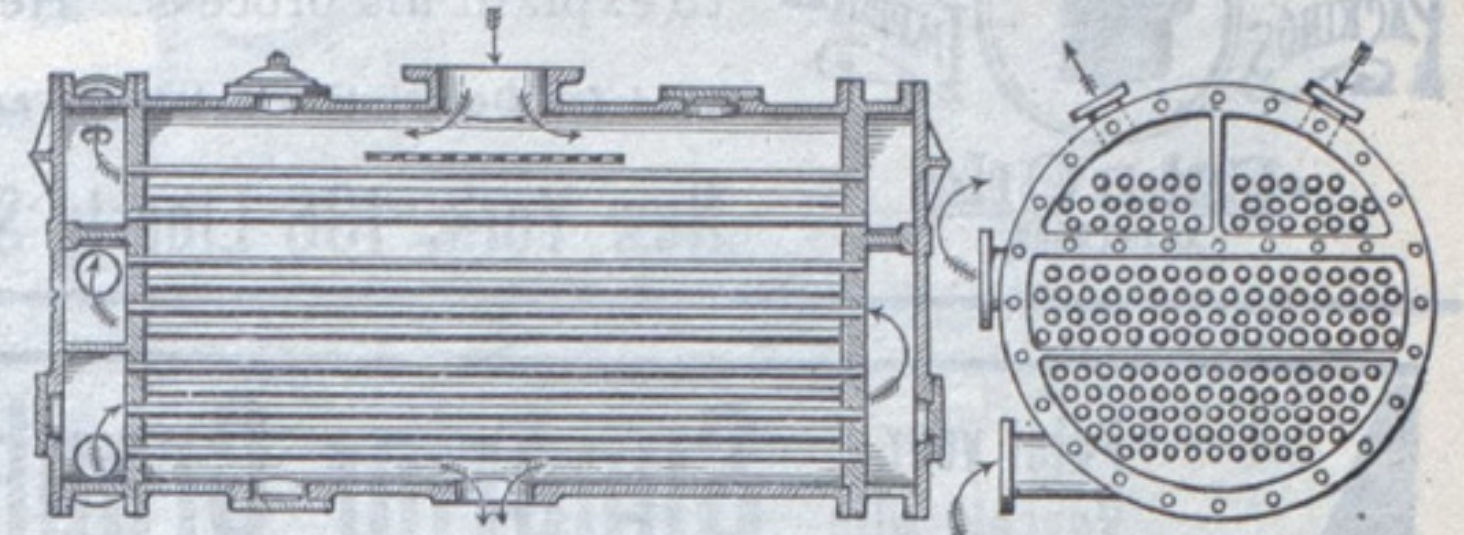
39 &amp; 41 CORTLANDT STREET, NEW YORK.

## WHEELER'S IMPROVED SURFACE CONDENSERS

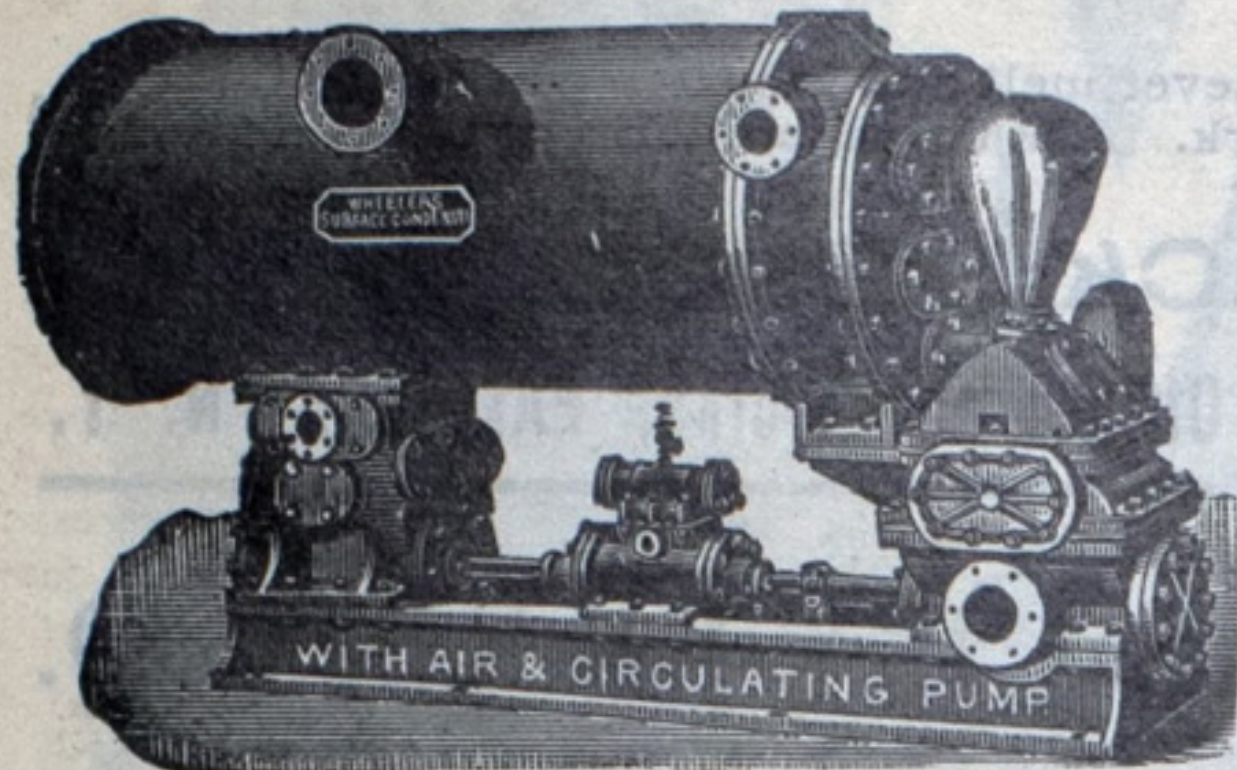
Mounted upon Combined Air and Circulating Pumps.

Sole Proprietors and Manufacturers of the  
 WHEELER STANDARD SURFACE CONDENSER.  
 WHEELER ADMIRALTY SURFACE CONDENSER.  
 WHEELER LIGHT HALL SURFACE CONDENSER.  
 VOLZ PATENT COMBINED SURFACE CONDENSER AND  
 FEED-WATER HEATER.  
 WHEELER FEED-WATER HEATER, AIR AND CIRCULATING  
 PUMPS.  
 EDMISTON PATENT FEED WATER FILTER.

Send for Pamphlet, "Machinery for Small Boats, etc."



PATENT COMBINED SURFACE CONDENSER AND FEED-WATER HEATER.



WHEELER SURFACE CONDENSER, Mounted on Combined Air and Circulating Pumps.

### P.M. CHURCH & CO.

SAULT STE. MARIE, MICH.,

**Ship Chandlery,**  
**Hardware, Paints, Oils,**

And all classes of

VESSEL SUPPLIES.

Coppersmith Shop in connection.

Corner Portage and Ashmun Sfs.

TELEPHONES: - { OFFICE NO. 7.  
RESIDENCE NO. 4.

#### FACTS CONCLUSIVE.

We expect your patronage because the Nickel Plate Road operates conveniently scheduled trains equipped with unexcelled dining cars and luxurious sleepers between Chicago, Cleveland, Erie, New York and Boston. Lowest rates. 487-52

#### Eight Elegant . . . PHOTOGRAVURES

—SIZE, 10 x 17 INCHES.

Whaleback Steamer Christopher Columbus,  
 STATE OF OHIO—STATE OF NEW YORK,  
 Steel Ship Builders,  
 Steamer ARTHUR ORR,  
 English-Built Steamer TURRETT,  
 Dry Dock Representatives,  
 Schooner JOHN FITZPATRICK.

Complete set mailed to any address on receipt of 25c.

SMITH &amp; SMITH,

144 Superior Street, CLEVELAND, O.

Nickel Plate Road, low rates and perfect service are all synonyms. A through sleeping car service between Chicago, Ft. Wayne, Cleveland, Erie, Buffalo, New York and Boston. 491-52

### THE CHASE MACHINE COMPANY,

MACHINISTS, ENGINEERS AND BLACKSMITHS.

MANUFACTURERS OF

## Land & Marine Engines & Steam Pumps,

SOLE OWNERS AND MANUFACTURERS OF THE

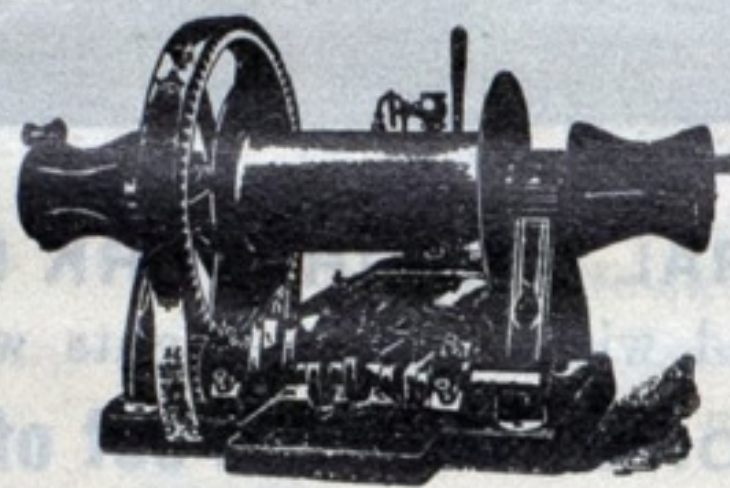
CHASE AUTOMATIC FOG WHISTLE MACHINE,

IN USE ON NEARLY ALL LAKE STEAMERS.

Agents for ASBESTOS STEAM, BOILER AND PIPE COVERING.

Telephone 994.

111 Elm Street, CLEVELAND, O.



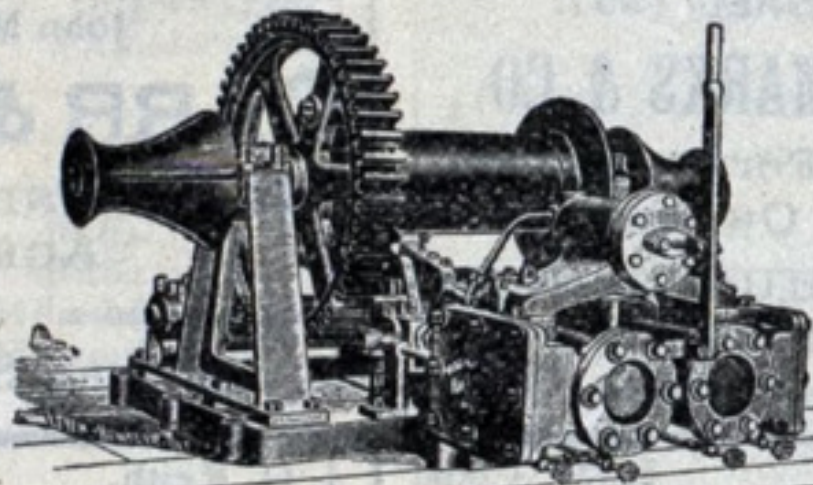
### JACKSON & CHURCH,

BUILDER OF DUPLEX HOISTING AND DECK ENGINES.

Plain Finished and Automatic ENGINES, From Heavy Patterns at Moderate Prices.

Vertical, Horizontal, Marine and Locomotive BOILERS Strictly First-Class and Highest Test.

SEND FOR CIRCULAR AND PRICES. SAGINAW, MICH.

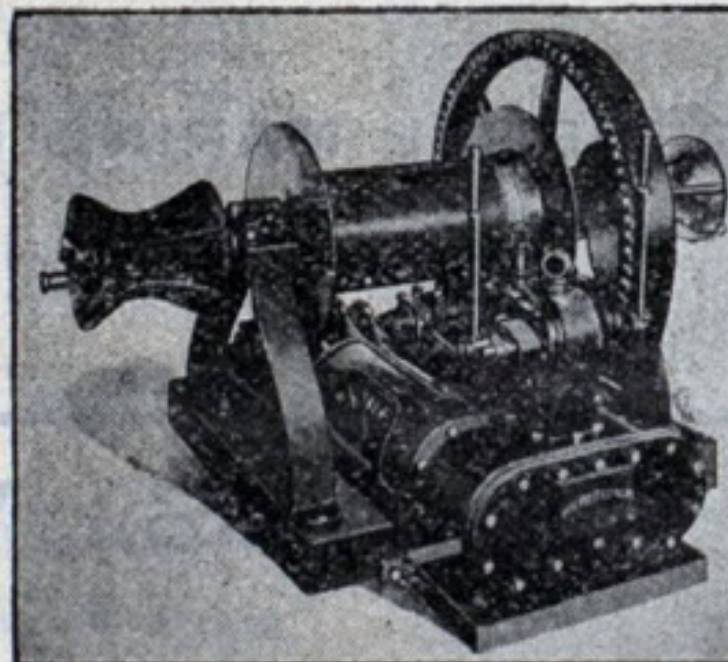


### DECK AND DOCK HOISTS

Our Hoists will be found on the following boats: Tugs—Superior, Sumner, Sweepstakes, Winslow, J. K. Emmett, Acme, Mockingbird, Waldo Avery, Reliance, John Owen, Charlton, Howard, Duncan City, Chamberlain, Balize, Sampson, Westover, Gladiator, W. B. Castile, Home Rule, Robert Weideman, Boscobel and Peter Smith; Propellers—Metamora, Abercom, Penobscot, J. J. McWilliams, I. W. Stephenson, John W. Pauly; Barges—Jenness, Noquebay, Mantatee. Also in use by F. W. Wheeler & Co., W. B. City, Mich., Blood and Hart, Marine City, Mich., Michigan Salt Works, Marine City, Doty Bros., Pile Drivers, Toronto, Canada.

MARINE IRON CO.,

BAY CITY, MICH.



### DECK HOISTS

Coal and Contractors' Hoists,  
 Steam Steering Gears and  
 Conveying Machinery  
 For all Purposes.

MANUFACTURED BY W. H. WHITEMORE,

WRITE FOR PRICES.

WEST BAY CITY, MICH.

### J.J. KEENEN, RIVERSIDE STEAM BOILER WORKS.



Marine, Locomotive and Stationary Boilers.

Marine Work a Specialty.

SHEET IRON WORK OF ALL KINDS.  
REPAIRING PROMPTLY ATTENDED TO.

Office and Works, Cor. Cologne and Fuller Streets,

Telephone, Canal 401

CHICAGO.

### JEFFERY'S MARINE GLUE

For Paying Seams of Decks and other Purposes.

L. W. FERDINAND &amp; CO.,

BOSTON, MASS.

SEND FOR CIRCULAR.

J. H. OWEN, Prest., Chicago. F. H. VAN CLEVE, Sec'y, Escanaba. Capt. GEO. BARTLEY, Supt., Escanaba.

### ESCANABA TOWING & WRECKING CO., Escanaba, Mich.

Tugs, Lighters, Steam Pumps, Hawseers, Hydraulic Jacks and Diving Appliances always ready.

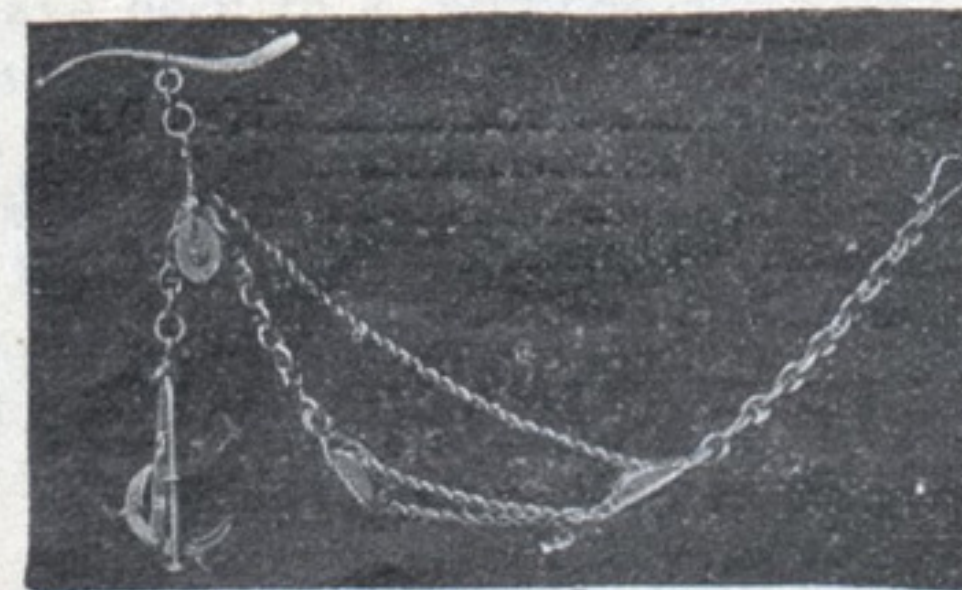
TUG MONARCH—Engine Compound, Cylinder 16 &amp; 30 in. diameter, 30 in. Stroke, Steam Pressure allowed, 125 lbs.

TUG DELTA—Cylinder 20 by 22. Steam Pressure allowed, 105 lbs.

TUG OWEN—Cylinder 20 by 20, Steam Pressure allowed, 104 lbs.

CENTRIFUGAL PUMPS.

SEVEN AND FOURTEEN INCH SUCTION.



### Nautical Watch Chain.

SOLID GOLD. SHIP-SHAPE IN EVERY DETAIL.

Sheaves work, snatch block opens out and seizings are passed correctly.

MORGAN A. ROBERTSON,

26 John Street, New York

Send for Descriptive Circular.

### FOR SALE CHEAP.

#### GOOD TUGS.

18 to 22-inch cylinders. All in good condition. Address

HIGGIE &amp; SHAW, 1 Franklin St., Chicago.

#### DRAWING AND ROUGH SKETCHING

For Marine Engineers. Just published, price \$2.00, postage prepaid. Sixth edition, 13th thousand, enlarged to 226 pages and 100 plates and diagrams. IN TWO PARTS BOUND IN ONE VOLUME. By

JAMES DONALDSON, Consulting Engineer, 25 Tower Buildings, LIVERPOOL.

ALSO

DONALDSON'S

ENGINEERS' ANNUAL AND ALMANAC FOR THE YEAR 1896.

A record of progress and events in connection with steam shipping. Price 35 cents, postage prepaid.

### FRANKLIN HOUSE

Corner Bates and Larned sts., only a block from Woodward and Jefferson aves.

DETROIT, MICH.

The house has been thoroughly renovated and is in the heart of the city, convenient to all car lines, depots and boat landings.

Per Day, \$1.50. H. H. JAMES.

### To Owners of Excursion Steamers.

Bids for furnishing steamer and conducting passenger traffic to and from Woodlawn Beach for season of 1896 will be entertained at the office of the Company, 27 Lewis Block, 13½ East Swan Street, Buffalo, N. Y.

For Particulars please write

WOODLAWN BEACH CO.

HUGH C. MAHARG, Sec'y.

The Nickel Plate Road operates a perfect passenger service, composed of first and second-class day coaches attended by colored porters. Excellent dining cars and through sleeping cars to Chicago, Cleveland, Buffalo, New York and Boston. Rates always the lowest. 490-52





# CRANDALL'S PATENT PACKINGS.

FOR STEAM, WATER AND AMMONIA.

Not having been subjected to the injurious chemical action of boiling oil, outlast all others, and never melt and gum. We are constantly displacing other packings on Lake and Ocean Steamers, and can guarantee our goods for marine work. Ask the man offering "the same thing" to explain his process. He boils his goods in oil.

Send for Descriptive Catalogue and Samples.

New York, 136 Liberty Street. Chicago, 51 S. Canal Street.

**CRANDALL PACKING CO.**

Main Offices and Works, PALMYRA, N. Y.

Paint your  
Vessels with

## Superior Graphite Paint

NO BLISTERING, CRACKING OR SCALING.

Made especially for Stacks, Decks, Sides, Hulls and Water Compartments.  
Strictly anti-rust, and most durable and economical.

DETROIT GRAPHITE MFG. CO. 542 River St., Detroit, Mich.

WHITTON & BATES, Agents, 563 Perry-Payne Building, Cleveland, O.

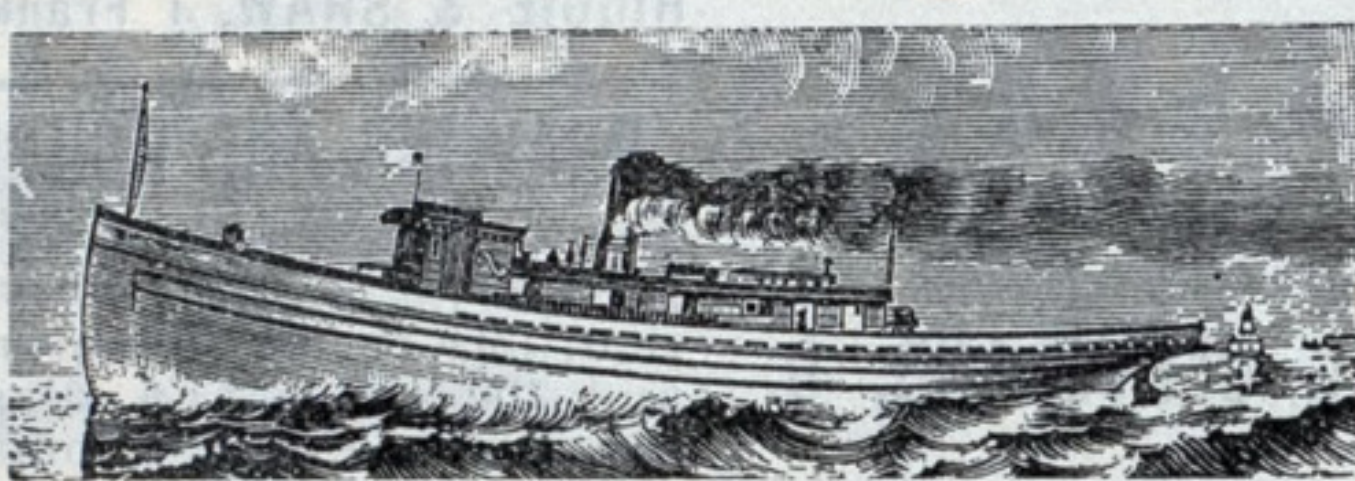
H. A. HAWGOOD, Pres't.  
PHILIP MINCH, Vice-Pres't.

GEO. ELSEY, JR., Gen'l Mang'r.

J. A. SMITH, Sec'y.  
J. R. SPRANKLE, Treas.

## The Cleveland Tug Company,

First-class Tugs,  
Steam Pumps,  
Divers, Hawseers,  
Lifting Screws,  
Etc., furnished  
Promptly on  
Orders by Tele-  
graph or oth-  
erwise



Steamers when  
outside wanting  
our Tugs, blow  
one long whistle  
and as many  
short ones as  
they want tugs.

OPEN DAY and NIGHT.

DOCK and OFFICE FOOT of FRONT ST.

Long Distance Telephone 725.

Cleveland, Ohio.

C. D. THOMPSON, Manager.

C. L. BOYNTON, Sec. & Treas.

## THOMPSON TUG LINE,

PORT HURON, MICH.

Tug Geo. E. Brockway, engine 28x30; Tug M. F. Merick, 2 engines 20x24, each;  
Tug James Ash, engine 14x16; Lighter Clinton, 650 tons capacity, with full wrecking outfit,  
stationed at Sault St. Marie, Mich.

Tug C. D. Thompson, engine 22½x26; Tug C. L. Boynton, compound engines,  
17x34x30 in. stroke; Tug J. C. Ingram, engine 17x19; Lighter Mentor, 450 tons. Com-  
plete wrecking outfit stationed at Port Huron, Mich. Sch. John Wesley, 85 tons.



## The "CINCINNATI" Automatic STEAM STEERING GEAR

Simple, Powerful Machine.

Noiseless and Sure.

Send for Circular.

FRONTIER IRON WORKS, Detroit, Mich.,

AGENTS FOR THE LAKES.

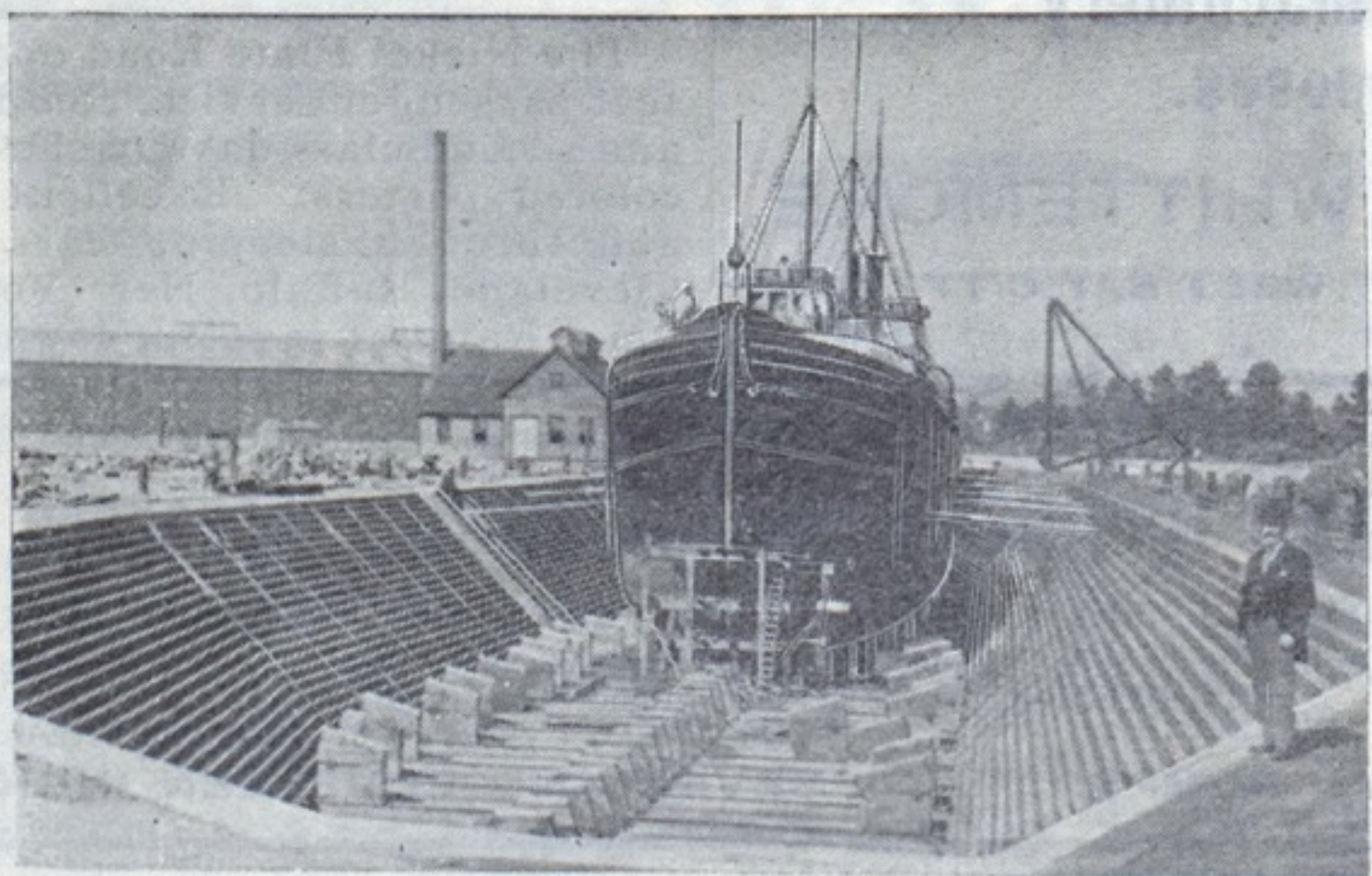
## AMERICAN STEEL BARGE CO.

STEEL AND METAL SHIPS

OF ALL CLASSES BUILT ON SHORTEST POSSIBLE NOTICE AT OUR YARDS AT  
WEST SUPERIOR, WIS., and also at EVERETT, WASH.

PHOTOGRAPH OF 300 FT. BOAT IN DOCK.

Plates and  
Material  
Always on  
Hand to  
Repair all  
kinds of  
Metal  
Ships in  
Shortest  
Time.



Best  
Quality  
of Oak in  
Stock for  
Repairing  
Wooden  
Vessels  
of all  
Classes.

### SIZE OF DOCK

Length, Extreme.....537 feet.

Breadth, Top.....90 " 4 in.

Breadth, Bottom.....52 "

Entrance, Top.....55 feet 9 in.

Entrance, Bottom.....50 "

Depth over Sills.....18 "

LARGEST DRY DOCK ON THE LAKES.

PRICES FOR REPAIRS AND DOCKING  
SAME AS AT LOWER LAKE PORTS.

SUPERIOR, WIS.

A NUMBER OF PROPELLER WHEELS IN STOCK AT DRY DOCK.

## THE SHIP OWNERS DRY DOCK CO.

Largest

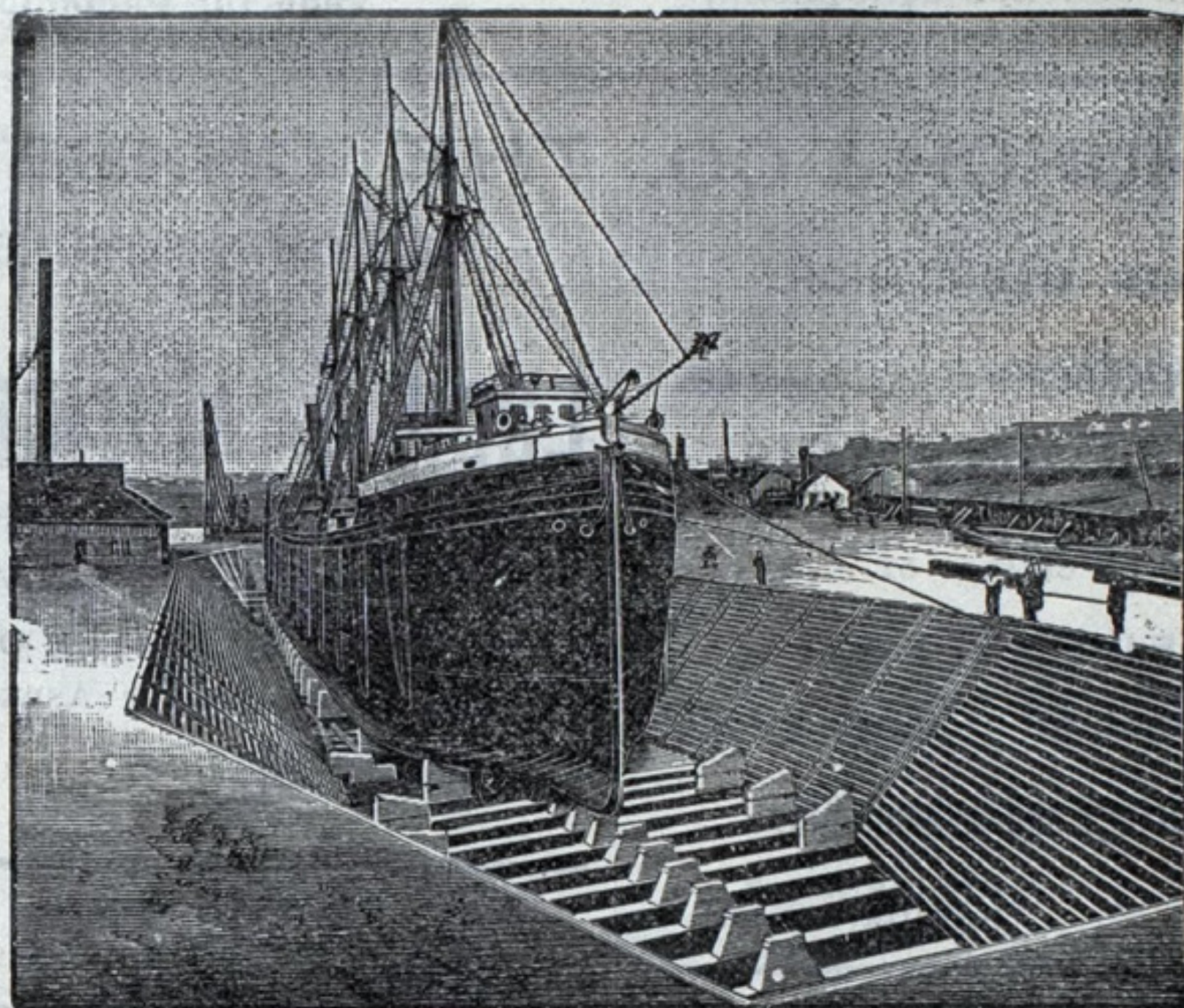
DOCK

YARD

on the

GREAT

LAKES.



Capacity

with

Two Docks

to Dock

the

Largest

Ships on

the Lakes.

GENERAL REPAIR WORK PROMPTLY ATTENDED TO.

Being equipped with Lucigen Lights we can do work at night as well as day.

TELEPHONE 1635. Foot of Weddell St. CLEVELAND, O.

ESTABLISHED 1857.

### THOMAS MARKS & CO.,

Merchants, Forwarders and  
Ship Owners.

PORT ARTHUR, CANADA.

N. B.—Special attention given  
to chartering vessels.

Calvin Carr.

G. C. Blair.

John Mitchell.

### CARR & BLAIR

VESSEL AND INSURANCE

AGENTS,

Rooms 1 and 2. Tel. Main 869.  
12 Sherman St. CHICAGO.

A. A. Parker.

James W. Millen.

B. W. Parker.

### PARKER & MILLEN,

Vessel & Insurance Agents.

Iron Ore & Coal Cargoes a Specialty.

Rooms 3 & 4 15 Atwater St., West.  
DETROIT, MICH.

C. F. Palmer.

H. W. Cook.

Capt. J. A. Calbick.

### Palmer, Cook & Calbick,

Vessel Agents and Underwriters,

No. 6 Sherman Street, Chicago, Ill.

Telephone, Main 3952

J. G. Keith.

D. Sullivan.

### J. G. KEITH & CO.

VESSEL AND

INSURANCE AGENTS,

140 and 141 Rialto Bldg. CHICAGO.

Telephone No. 3658.

### JOHN PRINDIVILLE,

VESSEL AND

INSURANCE AGENT,

12 Sherman Street,

CHICAGO.

## C. A. MACDONALD & CO.,

GENERAL MARINE INSURANCE AGENTS.

RIALTO BUILDING,

CHICAGO, ILL.

## THOS. WILSON,

MANAGING OWNER WILSON'S TRANSIT LINE,

General Forwarder, Freight and Vessel Agent.

CLEVELAND, O.

## C. R. JONES & CO., VESSEL AGENTS

FIRE AND MARINE INSURANCE.

Nos. 501, 502 and 503 Perry-Payne Bldg., CLEVELAND, O.

JOHN MITCHELL.

JOHN F. WEDDOW.

ALFRED MITCHELL.

### MITCHELL & CO., Vessel and Insurance Agents,

Office Telephone, 767.

Residence John Mitchell, 3506.

508-509-510 Perry-Payne Building,

CLEVELAND, O.